

**INFORMATION TECHNOLOGY IN LIBRARIES OF
SCIENCE & TECHNOLOGY (S&T) ORGANIZATIONS: A
COMPARATIVE STUDY OF SELECTED LIBRARIES OF DELHI**

A Thesis

**Submitted to the Bundelkhand University, Jhansi
in fulfillment of the requirements of the degree of**

**DOCTOR OF PHILOSOPHY
IN
LIBRARY & INFORMATION SCIENCE**

By

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2001

CERTIFICATE

This is to certify that the thesis entitled "*Information Technology (IT) in libraries of Science and Technology (S&T) organizations. A comparative study of selected libraries of Delhi*" being submitted by Sh. Shujat Husain to the Bundelkhand University, Jhansi, for the award of Doctor of Philosophy, is a record of bonafide research work carried out by him.

Sh Shujat Husain has worked under my guidance and supervision and has fulfilled the requirements for the submission of the thesis, which to my knowledge has reached the requisite standard.

The results carried in the thesis have not been submitted in part or full, to any other university / Institute for the award of any degree or diploma.

Sh. Husain has worked under my supervision for more than the period as required in the Ph.D. degree ordinance of the University. He has also put the requisite attendance in the department during the period.



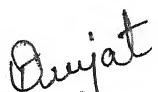
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July, 2001

DECLARATION

I hereby declare that the thesis entitled "*Information Technology (IT) in libraries of Science and Technology (S&T) organizations. A comparative study of selected libraries of Delhi*" being submitted to the Bundelkhand University, Jhansi for the award of Ph.D. Degree is a record of original research work carried out by me in the continuous and regular guidance of Dr. M.T.M.Khan, Prof. & Head, Department of Library & Information Science , Bundelkhand University, Jhansi. With the best of knowledge and belief the thesis is not submitted in any form or part for the award of any degree for other higher education in any other university.


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_____, July, 2001

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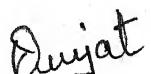
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ABSTRACT

Information Technology (IT) has brought information revolution with tremendous opportunities and competitive advantages. The Libraries being the information based organizations are also deeply affected by the changes brought by the Information revolution. For Libraries of Science and Technology (S&T), IT has also brought unlimited opportunities and opened the new application areas with unlimited use, great promise, high expectations, and unimaginable dimensions for them. Though it is observed that the use of IT in these libraries is not uniform. It varies from library to library. There are several organizational and perceptual factors responsible for this variation. The objective of this study was to understand the factors responsible for this variation.

In its Chapter 1, an overview of the study, statement of the problem, objective of the study, its scope and limitations, need & significance, its organization are given. In its Chapter 2, a brief description about Information technologies, and S&T Libraries is given. The Chapter 3, contains a review of literature on Basic Goal of S&T Libraries, their Information Systems, Management process, Application of IT, System Approach, System Analysis, SWOT Analysis, Concept of change management, Use of IT in S&T Libraries, Socio-Cultural & Technological Environment, Factors of Success and Failure of IT Applications, Structure of a computer-Information System (IS) are given. In chapter IV the conceptual frame of the study & Criteria for evaluation are given. In this chapter the Assumption, Variables, Basic Frame of the Study, Derivation of Null Hypothesis, Model Criteria, Conceptual Frame Work, Nolan's Stage Hypothesis, Matrix for Library activities, Components of IT based Information system in S&T libraries, IT based Information System (IS) Development Life Cycle are given.

The Research Design is given in Chapter V. In Chapter VI, the Organizational study Containing a brief overview about the 75 organizations undertaken in the study and their Resources Data Matrix are given. In Chapter VII, Study of Organizational Culture is described which also contains Statistical analysis of Statements, testing of Hypothesis using Chi-square Significance. In Chapter VIII, the Conclusion and recommendations, and areas of further research are given.

In the end of the thesis, the Bibliographic references cited in the study are given. In Appendix.1, the Questionnaire, & Organization Data Sheet are given. A brief bio-data of the author is also given in Appendix. 2.

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CHAPTER - 1

INTRODUCTION

The title of the study is "Information Technology (IT) in libraries of Science and Technology (S&T) organizations. A comparative study of selected libraries of Delhi". This chapter initially provides an overview of the study and elaborates the Statement of the problem, the objectives, scope and limitations of the study, Need and the rational behind the choice of the field for the present study. The back ground of the present study is also discussed. In the end of chapter the organization of the study is also given.

1.1. Overview of the study:

After independence in India, S&T utilization was considered as the highest prioritized area and as a tool for nation development. In every five years plan, the S&T was given its due place. Various committees, councils, Departments, Advisory boards, Collaborations at National, International as well as Centre & States levels were created for S&T development. In the latest two five years plans, the high priority was also given to the Libraries, Information systems in the field of S&T. Like other essential necessity information was also considered as the most essential commodity. At national level Information systems of S&T libraries and Information center such as NISSAT was Created. The National center for science Information was also set up by U.G.C at the Indian Institute of Science, Bangalore. In the recent past, India has also made unprecedented progress in the field of Computer and Communication Technologies and made its place at the world map of Information Technology. INSDOC, DESIDOC, National Medical Library, AIIMS, IARI Library, Information Centre of Bureau of Indian Standards, National Institute of Pharmaceutical Education and Research (NIPE), All India Board of Hotel Management & Catering Technology (AIBHMCT), IISc Bangalore,

BARC, TIFR, IITs, Constituents information Centers of NISSAT and few technological university libraries such as Roorkee university, JNTU (AP), BITS Pilani etc. have rich library collection in the S&T field. All these libraries & Information Centers together may be spending more than 150 Crores annually for procuring publications, journals and other documents. The users of most of these libraries are Scientists, technologists, Medical Practice nor, Pharmacist etc. For the purpose of library resource - sharing , these libraries and Information Centers are also using Library networks such as **Inflibnet, Delnet, Calibnet, Malibnet, Bonnet** etc.

The S&T development has many phases and milestones. The first phase was naturally basic research which was having very little direct linkage with industries. In second phase the research was end use oriented. In third phase mainly the trends of research were concerning to the multiple technologies for high industrial productivity. In the forth phase the research was concerning to the large scale manufacture and marketing. In The globalization of world trade in the early nineties opened up yet another phase in the S&T scene in India. In this new millennium efforts were made and the success achieved in the core technologies and more recently in the software market gave a confidence that India made sustained efforts to convert its educational scientific and industrial resources into strength.

The Department of Science and technology (DST) making funding to the Academic and R&D organization for both the basic as well as applied research cutting across discipline and several disciplines and barriers. DST also creating infrastructure facilities, technology development, and transfer of technology. The Industrial Policy Resolution (IPR) of 1948, the Scientific Policy Resolution (SPR) of 1958, Technology Policy statement (TPS) of 1983, (Jain, Ashok 1989) and recently launched missions by DST , 2001) such as Jai Vigyan Mission and India Millennium mission on topic of national importance as well as policies

such as Information Technology Policy etc are some of the milestone in the history of S&T in India, (Ramamurthy, 2001).

In India, in the field of S&T, there are more than 450 Central Government funded R&D Institutes. Majority of the Central Government Organizations in S&T fields, came under CSIR, DRDO, ICMR, ISRO, DST, DAE, ICAR and few other government departments. At present there are about 250 University Institutions. Of these , 161 are traditional universities which are also having different S&T departments/ Centers along with other subject field of study and research. About 34 universities provides education in agriculture including forestry and dairy, fisheries, and veterinary science. 18 universities provides teaching and research in medicine and 25 in engineering and technology including 6 IITs. In addition to this there are more than more than 800 State owned R&D institutions and about 1350 Privately owned academic and R&D Institutions. All these institutions are having a well established Library, Documentation center and / or Information Center to cater the information need of their user scientists and technologists.

It is also observed that the libraries & Information documentation Centers are also using new Information technologies in serving their users. The main driving forces (External Environment) of transformation in the S&T libraries are: i). Global economics, ii). Politics and policies, iii). enlightened population, and iv). Technology.

The information technology (IT) is a generic term that covers acquisition, processing, storage and retrieval of information. IT has a much wider connotation which includes application of computers, CD-ROMs, and network technologies in the task of information handling. . Information technology is a boon for mankind. It has revolutionized every facet of human being. It gives accessibility to information at the finger tips. Information rich person or a country can made more progress. IT is composed of following technologies:

- Computer Technology

- Communication Technology
- Optical /Video (CD-ROM) technology
- INTERNET & Web technologies

The New Information Technologies (IT) have also influenced the every facet of library activities. The latest advances in computers, telecommunications and Internet have made circumstances more conducive for the S&T organizations to adopt IT in their libraries also. Computerization remained the first preference of these S&T libraries in their policies during the decades of 80's and 90's when it finally succumbed to the superiority of Internet. A computer is effective only in reflecting and utilizing one's in-house resources whereas Internet with its worldwide connection is more powerful for the development of these S&T libraries.

The rapid development of the digital network all over the world during the last 20 years has promoted communication of information at a mind boggling speed. This has proved comparatively more fruitful for library and information centers compared with any other organization, due to economy in storage and utility, accuracy and speed in retrieval for it. The browsers require only a few clicks on easily figured icons and link to the whole oceans of information. In the past ten years, it has been so popular that the number of Internet users has jumped from 600,000 to 1.40 million and it is expected to grow further to 350 million within the next three years.

These IT advances have brought dynamic changes in the library systems to get maximum competitive advantages, and new opportunities. Effective use of such advances in the systems provide value to their library activities by (a) allowing the organization to respond rapidly to changing library user's requests, (b) improving quality and fostering innovation, and (c) competing and serving at global basis.

With the use of new technologies, the organizations, customer, and users can make possible to perform or have their work performed quicker with better quality and at low cost. Such IT advances have opened new application areas for these libraries with great promises, high expectations, unimaginable dimensions.

1.2. Statement of the Problem:

The study deals with the use of IT mainly the Internet & Web technologies by the S&T libraries of Delhi region. The use aspects related to benefit of IT has been explored by various authors. The benefits of the IT can be measured in terms of enhanced processing speed, transmission rates, and access time (Grover V and Segars AH ,1996). The introduction of micro and mini computer has enabled greater decentralization of information systems (McKesie RB and Walton RE ,1991). Recent innovations such as LAN make possible the linking of task, groups and managerial work processes (Venkatraman N, 1991). These IT capabilities are likely to impact culture, structure and work practices (Doherty NF and King M , 1998). Among other thing IT can alter the information environment of organizations, specially leading to more informality and can overcome the constraints of time and speed. It reduces the administrative staff which results a leaner organization (Wijnhoven ABJM and Wassenaar DA ,1990). There are very few study were conducted on the extent of use of IT in S&T libraries.

Now IT are also being used by the S&T libraries in their activities -specially their processing and management functions - accessing, organizing, storing, and retrieving information (abstracts, full text online).

Though the efforts are being made from time to time to use the Computer (Information technology) and system approach techniques in the management of libraries

since the early 1970s. But in spite of these efforts, there, are gaps in the use of computer in S&T Library information in comparison to the industrial or business organization. The factors responsible to these gaps are many. Ranine (1981) identifies two major factors: i) lack of comprehensive and effective Information system (IS) framework, and ii) the library managers attitude and familiarity with the tools, techniques, and procedures to improve the existing IS. The dynamics of change in S&T libraries is affected from several interrelated factors such as organizational, human, economic, and technological. Further the process becomes more complicated because these factors involves many considerations which influence the future development of IS. Clack (1993) viewed IS as total quality management (TQM) and discussed some issues related to library environment. These issues are; Steering committee, leadership, communication, training, tools and processes, and recognition and rewards. In conclusion the managers of libraries need not only their active participation in the IS development but they also need appropriate methodologies which will aid them in development of effective computer-based IS. Inspite of these facts, there are very few Libraries who have adopted these technologies. These technologies are not being adopted uniformly and there is a **gap in the extent of their use..**

Sangla, ML (1992) suggested the Nolan (1979 & 1982) stage growth Model for assessing the extent of use of IT in public enterprises. In S&T libraries there are very study where such model is used to assess the gap in the extent of use of IT in S&T libraries. With the phenomenal growth in IT in general and computerization in S&T libraries in particular , a study looking in to the development of information systems in S&T libraries could prove to be useful in establishing the status of computer use in these libraries and assist the planners to formulate the long term computer use related strategies.

1.3 OBJECTIVE OF THE STUDY:

The objective of the study is to: "To explore the Organizational perceptual factors responsible for the use of computer in S&T Libraries of Delhi region & based on the literature search and experience, to design a Model of Computer-based IS for a very large and complex networking environment of S&T libraries." Following purposes guided the study:

- To review the related literature.
- To study the Growth and Development of Information Technology (IT) in the Academic as well as Research libraries in the field of science and Technology (S&T) of Delhi region.
- To study the factors associated with the use of IT in the libraries.
- To design a system methodology for growth and development of IT in S&T libraries.

1.4. Scope & Limitation of the of the Study:

As per the Directory of R& D Institutions (1999) and University Handbook (2001), in India, at present there are about 3000 Institutions engaged in academic, teaching and research in the field of S&T. Out of these S&T institutions there are more than 450 Central Government funded R&D Institutes, 160 traditional universities which are also having different S&T departments/ Centers along with other subject field of study and research. About 34 universities provides education in agriculture including forestry and dairy, fisheries, and veterinary science. 18 universities provides teaching and research in medicine and 25 in engineering and technology including 6 IITs. In addition to this there are more than 800 State owned R&D institutions and about 1350 Privately owned academic and R&D Institutions.

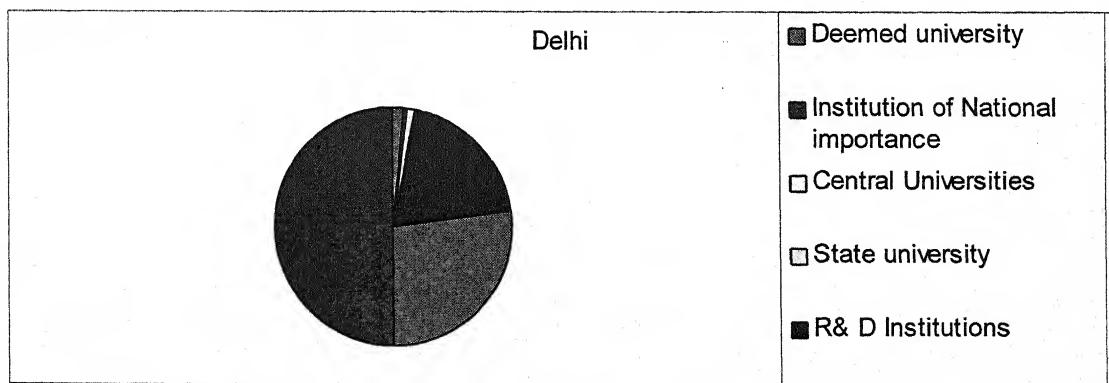
The study is limited to the libraries of Teaching and Research S&T Institute of Delhi region. It is also limited to the extent of Information Technology, mainly Internet by the libraries of these institute. The study is of exploratory of nature and it is limited to the perceptual and organizational factors responsible for slow or high growth of IT in these libraries. In the study efforts are made to explore the use of Information Technology by the S&T libraries of Delhi region.

In the use parameters of IT, mainly the Library networking, Internet connectivity, the conversion of bibliographic records on Internet, the Online Public Access Catalogue (OPAC), use of Internet, electronic journals, ERL based CD-ROM, Bar coding, document digitization, Web designing, Library resource sharing etc. are undertaken.

In Delhi State, there are about 174 R&D institutions in the field of S&T, out of which 13 are University level Institutes, 66 Government R&D Institutions and about 95 are privately run R&D Institutions. (Table. 1).

Table. 1. Academic and Research Institutions in Delhi region fully or partially engaged in S&T.

Region	Deemed university	Institution of National importance	Central Universities	State university	R & D Institutions	Private R&D Institutions	Total
Delhi	6	2	4	1	66	95	174



S&T Libraries of Delhi region are taken as the representative sample for this study. Therefore, it will be difficult to generalize the findings of this study with other libraries of different nature available in geographically different locations. Second, the goal of this study is limited with the managers of S&T libraries, therefore, its applications are not broad in scope. All the factors associated with the use of Computer in Libraries also could not be covered. The study is limited to the use of Information technologies in libraries of the following type of S&T institutions of the Delhi State:

- Documentation Information Centers related to S & T such as INSDOC, DESIDOC, Information Center of Indian Bureau of Standards, National Medical Library, Central Library of Indian Agricultural Research Institute (IARI),
- All the higher educational Institutions related to Agriculture, Medicine & Technologies.
- Universities colleges related to the Agriculture, Medical and Engineering.
- All AICTE Technical institutions.
- All the Government Research Laboratories.
- As on June, 2001, more than 40 private S&T academic institutions in Delhi region are affiliated with the Guru Govind Singh Indraprasth University, Delhi. The growth and development of IT in all these 40 private institutions are also under taken in the study.

The following information related to the Information Technologies are to be explored in the given S&T libraries:

- Extent of Library Computerization
- Hardware and Software used
- Bar-coding
- OPAC
- Networking
- Use of Internet
- Electronic journals

- Computerized information services
- Member of DELNET

The Organizational study & perceptual study of the libraries of the S&T libraries of Delhi state are to be undertaken. In the Organizational study the SWOT analysis is used whereas in Perceptual study the LIKERT scale is used.

1.5. Need of the Study:

As explained above computer application in libraries provides relevant, timely and cost effective information. Like other management tools and techniques, the computer application was first appeared in the industrial and business management literature and it slowly began to find their way in library literature. This has become certain that sooner or later the library managers will also adopt these technologies in the management of library activities. The need of computer application is further justified because the university libraries are moving very fast towards computerization. In the near future the Computer application will be essentially needed by them.

In spite of this that S&T libraries are having all the characteristics of a model organization where computer application is found most successful, the adoption of this management tool is not uniform in these libraries. There is a gap. Some of the libraries are in advance stage of adoption, others are in a very initiative stage of adoption. Others do not aware about the use of such computerised techniques.

1.6. Significance of the study:

The study is intended to explore the fresh approach towards the management of Computerized Library. On the basis of literature survey, and field survey, its aim is to:

- Discovers the factors responsible to the gap in adopting of the IT technologies in S&T Libraries & suggest the indicators for growth and development Computer based Systems for these Libraries.
- Analyze the existing systems and finally to design a model for Computer based Information System for S&T Libraries.
- Its investigation will substantially contribute to the applied aspect of Library and Information Science. The significance lies in the facts that :
- It provides a framework of the Information Development (IS) development & Design in S&T Libraries
- It gives some direction about the orientation of the future development of MIS in other libraries in India.
- It suggests ways enhancing the channels of communication between the library managers and IS development teams.

1.7. Organization of the Study:

The study is organized into 8 chapters. Chapter first is Introduction which provides an overview of the study, need of the study, Statement of the problem, Scope of the research, objective and significance of the study. Chapter. 2 Information technology and S&T libraries, provides a brief introduction about the use of Information Technologies (IT) in S&T libraries. Chapter 3 Review of the Literature. In Chapter 4 Conceptual frame , Derivation of Hypothesis, and Criteria for Evaluation are given. In Chapter 5 the Research Design of the study is given which discusses about the nature of the study, Assumptions, Variables, conceptual frame of the study, Research design for study of Organizational study resources, Organizational culture, Derivation of Hypothesis, Procedure, Processing of

Primary Data. In Chapter 6, the Organizational data analysis was made using descriptive Statistical Methods. Chapter 7, provides the results of the Analysis of data related to the Internet use, managerial Culture, attitude, and perception. In this chapter the statement wise analysis, Chi- Squire test, testing of Hypothesis are made. In Chapter 8, the Results, and conclusion were drawn and recommendations were made based on the literature review, and on the basis of the result of organizational studies, and Perceptual studies.

In the end the References cited and four appendix are given. With each cited references its year of publication is given in bracket after main heading of entry. The references are arranged alphabetically. In appendix 1, the questionnaires is given. In Appendix 2 the Internet use questionnaire is given. The Data sheet used for Organizational and perceptual study are given in Appendix 3. In Appendix 4, a A brief Curriculum Vitae of the author is also given.

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A SCHEMATIC PLAN OF STUDY

RESEARCH METHODOLOGY USED

RESEARCH TOPIC:

"Information Technology (IT) in libraries of Science and Technology organizations. A comparative study of selected libraries of Delhi".

Status of IT based facilities available in the libraries of proposed S&T organizations	Review of Literature.	Factors associated with the Growth development of I.T. in libraries of the given S&T organizations.
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Organizational study	Perceptual study
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Design of Criteria of Evaluation

Historic Methods of Research: - Observations -Study of records -Interviews	Survey Methods: -Questionnaire -Checklists -Observations, -Interviews,		Survey Methods of research: Questionnaire Checklist Observations
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Data Collection
Data Analysis
Organizational Data.: 1. Resources & SWOT related data 2. Culture, perceptions, attitude related data
Case study reports of the Individual Libraries
Summary Conclusions & Recommendations

CHAPTER - 2

INFORMATION TECHNOLOGY & S&T LIBRARIES

This chapter initially provides the background information related to the study. It provides an overview of Information technology in S&T libraries. The Definitions, abbreviations, terms and related information is also given in this chapter.

2.1 INFORMATION TECHNOLOGY:

The Information Technology (IT) is concerned with improvements in variety of human problem solving endeavours through the design, development of technologically based systems and processes that enhance the efficiency and effectiveness of information and associated knowledge in variety of strategic, tactical, and operational situations. Information technology is composed of hardware and software that enable the acquisition and use of information. The efforts at provision of IT based systems concerned implementation and use of new technologies to support office function. These have evolved from electric typewriters and electronic accounting systems to include very advanced technological hardware such as facsimile and personal computers to perform such important functions as electronic file processing, accounting and word processing. Now Networking is a major facet of IT.

Advances in computer technology have been paralleled by trends in communication technology. The Advance Research Project Agency Network or APRAnet as it is commonly called, emerged in 1960s, led to the internet protocol in the 1970s, and the internet in 1980s. Internet connectivity is now most of the Desktops, e-mail has become a "must have" business

capability, and the world wide web or WWW is on the verge of becoming a thriving business channels. The result is an emerging networking market. Business publications are investing heavily to attract readers - or browser - of their online publications. This is clearly the network age of information and knowledge.

2.2. INTERNET :

The application and usage of INTERNET resources in the field of S&T is witness as an explosive growth and development like many other subject field. E-mail, is the most used part of the INTERNET. There are several search engines available on the INTERNET can be accessed through Web browsers. Specific information can be accessed by typing its keyword, which will generate a listing with links to specific sites. The required information can be download on to the users PC. The scholarly and professional information may be seen available through INTERNET to the potential audience of millions. The INTERNET revolutionised the way information is stored, accessed and transmitted. The INTERNET, in particular, make it possible for any one who wishes to communicate research information to bypass the traditional gate keepers of the dissemination of such knowledge. It has brought us to the brink of yet another revolution just the way invention of the printing press had done 500 years ago. Now, a vast amount of scholarly information such as journals, conference proceedings, standards, patents, Government information, Gray literature, abstract & indexes can be found on the INTERNET.

INTERNET is a world wide network of computers interconnected by the TCP/IP protocol. It is a single most extensive information source, and powerful tool for retrieving electronic information and communication. Any one with access to computer and INTERNET search provider can put a site online. The INTERNET including WWW is

essentially for communication and information exchange among interested parties across the globe. It is a publicly available network where user sitting on one network can share information stored on computers across the network. INTERNET has no ownership. It is public and global in nature. The INTERNET consists of thousands of Network. The INTRANETS are the private networks, also based on TCP / IP protocol suite, connected through fire wall or security screens, and that are under the control of one or more organizations and on which general information is not shared with general public. Only authorized users can access such information. The EXTRANETS are business to business Internets used for sharing of information and transactions of each other business, again using TCP/IP protocol.

The INTERNET provides various services which mainly includes e-mail, file transfer protocol, and interactive services using the world wide web. The basic operation of an INTERNET is much like that of the postal services. The data to be sent through INTERNET are bundled in to electronic data packets with an header and tailer information including the source and destination Internet address. It is just like a sender sent its letter/ pages of written or printed information in an envelop / packet with the address and drop the same in mail. Each network delivers these electronic data packets to an appropriate router, which uses the header information to determine how to forward the packets onward to the destination host server using protocol through some communication media. Such Server again performs the sorting of such electronic packets and deliver them to its clients or Interconnected computer. Sorting of electronic packets is again in the same way as the sorting of letters / packets, and delivery to the appropriate forwarding office , using whatever transport mechanism is most suitable (bicycles, Vans, trucks, train, Airplane) are done in postal services. The IP addressed Server / Inter networked Computers performs the sorting of such electronic packets and deliver them to a Interconnected computer/ destination. It is not

concerned with the contents of the letter / packets, in the same way as postal services are not concerned with the contents of letters.

2.3. WORLD WIDE WEB (WWW OR WEB):

The WWW or Web uses text, graphics, interactively and to extending to video & audio. These characteristics make the Web most useful when used to explore intellectual and verbal knowledge and to a lesser extent when exploring effective learning with its versatility and interconnectedness. The web offers one of the most effective learning with its versatility and interconnectedness. The web offers one of the most effective ways to work with learners. It is easy to collate and put information on the web. The WWW is the most popular prevalent INTERNET applications. Once a WWW site it needs to be transferred on to a server that has a WWW server software program and is permanently connected to the INTERNET, so that such information is always available to the potential users. The INTERNET can be considered as a huge semi - structured data base containing enormous amount of information. It provides a unified electronic publishing platform by using Hypertext Markup Language (HTML). The HTML is a tagging convention for displaying information contained in a specially encoded text document. The Web is primarily a hypermedia publishing platform. The basic document of the Web is called home page. A name serves to identify the host logically independent of its point(s) of attachment to the network(s). The same host may have server names. An address identifies a point of attachment for purpose of delivering data to the host. The router uses the addresses to determine how to forward the packets onward.

An individuals, corporate bodies & Business organizations can create their own Web site to make their business information available on INTERNET through such Web site. In a given Web site there may be a single page to a million of pages search able through Indexes

etc. Through the Uniform Resource Locator (URL) a browser is able to locate a designated resources. The URL is the uniform addressing scheme of the Web. The instructions contained in a WEB page can include hyper link to other Web pages. Because the Web permits multimedia, including sound, video, virtual reality, and interactive programming, all forms of traditional media are represented on the Web.

A Web browser is the client side of the Web. The Web uses a data access protocol called Hypertext transfer protocol (HTTP). The browser uses the HTTP to request documents from server using URL. The browser then sends an HTTP request header to the server. The server then sends a HTTP response header which discusses the status of the response, and then the actual data are sent. With the help of search Engines or Directory services the information available on a particular Web can be found. All the search Engines do keyword searching against a database. The Search Engines use Web software agents known as spiders or robots or crawlers to automatically gather information from the Web sites. The INTERNET including the WWW, is essentially for communication and information exchange among interested parties across the globe. The interested parties may be individual consumers searching relevant information or business attempting to sell and advertise their products or information to potential consumers using WWW as the communication medium. The popular applications of INTERNET'S are e-mail, file transfers, and remote terminal access using telenet. The governments, publishing companies, Library and database services, Educational uses, community services, e- commerce, Interactive chat, Interactive games, and telephony are also some of the specialized directories in INTERNET.

In today's age, INTERNET became an effective tool of teaching and learning which has technological, social and motivational characteristic of real world. Following are some features of Web Based Teaching and Learning:

- Students can access course materials through internet.

- CD based video support.
- Tutor support to students through internet.
- Contact programmes organised at identified study centres..
- Web access through dial up connections, internets, Cable modems etc.
- Learners send their queries to the tutor through internet.
- Mode of evaluation through study centres and internet respectively.
- The teacher responds to the queries of students/learners.
- Send assignments & Receive complete assignments on the dates from the students.
- Send corrected assignment back to the students.
- Organise Internet Chat room discussion, contact sessions, etc.

Provide feedback to students and course co-ordinator on curriculum / instructional material, fast access queries (FAQ), etc.

2.4. LIBRARIES OF SCIENCE & TECHNOLOGY ORGANIZATIONS

(S&T LIBRARIES) :

The S&T libraries undertaken in this study are mainly the libraries of national laboratories, research institute, academic University institutions of Delhi region. This also includes the private managed S&T academic institutions specially affiliated with universities. Presently , in India, there are about 3000 Institutions engaged in academic institutions engaged in teaching and research in the field of S&T. Out of these S&T institutions there are more than 248 university level institutions which mainly includes 42 deemed universities, 161 traditional universities, while others are professional technical / institutions etc., some of them are totally dedicated to teaching and research in the field of S&T. Majority of these 248 university Institutions are having Departments, & Centers of Advance research in the field of S&T. State wise distribution of academic and R&D institutions is given in (Table. 2.1).

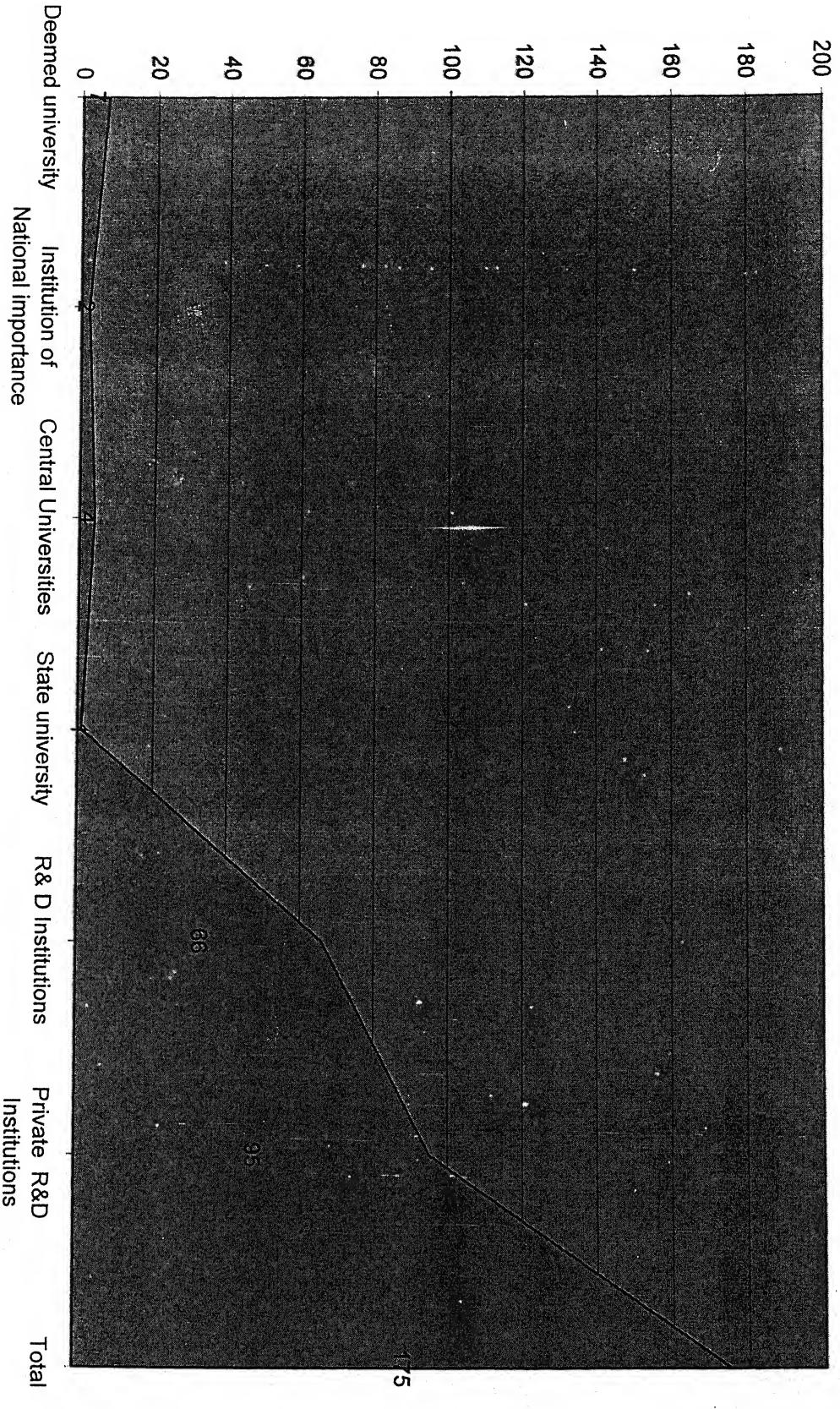
Table. 2.1 Academic and Research Institutions in India in the field of S&T. (Data based a per the Directory of R& D Institutions (1999) published by DST and University Handbook (2001) published by AIU,Delhi.

Name of the State /UT	Central Institute	state Institute	University	Public undertaken	Private R&D Institute	Total
Andaman & Nicobar Islands	2	0	2	0	0	4
Andhra Predesh	31	73	21	14	85	224
Arunachal Presh	1	1	1	0	0	3
Assam	7	24	6	1	3	41
Bihar including Jharkhand	11	23	18	10	11	73
Chandigarh	7	0	2	0	4	13
Delhi	58	0	6	8	95	167
Goa	2	1	1	0	3	
Gujarat	16	68	11	5	111	211
Haryana	11	20	5	7	49	92
Jammu & Kashmir	4	17	3	0	0	24
Karnataka	45	39	16	8	121	229
Kerala	15	59	8	5	22	109
Madhya predesh & Chattish Garh	12	47	19	2	28	108
Maharashtr	50	106	28	14	466	664
Manipur	0	0	2	0	0	2
Meghalaya	2	6	1	0	0	9
Nagaland	0	0	1	0	0	1
Orissa	15	31	5	1	4	56
Pondicherry	2	0	1	0	5	8
Punjab	3	18	6	1	16	44
Rajasthan	12	22	10	3	21	68
Sikkim	1	0	1	0	0	2
Tamil Nadu	29	90	23	7	160	309
Tripura	0	5	1	0	0	6
Utter Predesh & Utanchal Predesh	51	61	29	15	61	219
West Bangal	36	33	15	14	84	182
Total	430	777	253	115	1,351	2,918

Table. 2. 2. Academic and Research Institutions in Delhi region in the field of S&T.

(Data based a per the Directory of R& D Institutions (1999) published by DST and University Handbook (2001) published by AIU,Delhi.

Region	Deemed university	Institution of National importance	Central Universities	State university	R& D Institutions	Private R&D Institutions	Total
Delhi	5	2	4	1	66	95	173



Delhi

Table. 2.3 CSIR Research Institutions in India in the field of S&T. (Data based a per the Directory of R& D Institutions (1999) published by DST and University Handbook (2001) published by AIU,Delhi.

Name of the State /UT	Total
Andaman & Nicobar Islands	0
Andhra Predesh	3
Arunachal Presh	0
Assam	1
Bihar including Jharkhand	3
Chandigarh	2
Delhi	6
Goa	1
Gujarat	2
Haryana	0
Himachal Pradesh	1
Karnataka	
Jammu & Kashmir	1
Kerala	1
Karnatka	2
Madhya predesh & Chattish Garh	1
Maharastra	2
Manipur	0
Meghalaya	0
Nagaland	0
Orissa	1
Pondicherry	0
Punjab	0
Rajasthan	1
Sikkim	0
Tamil Nadu	3
Tripura	0
Utter Predesh & Utanchal Predesh	7
West Bangal	3
Total	41

CSIR Research Institutions in India in the field of S&T

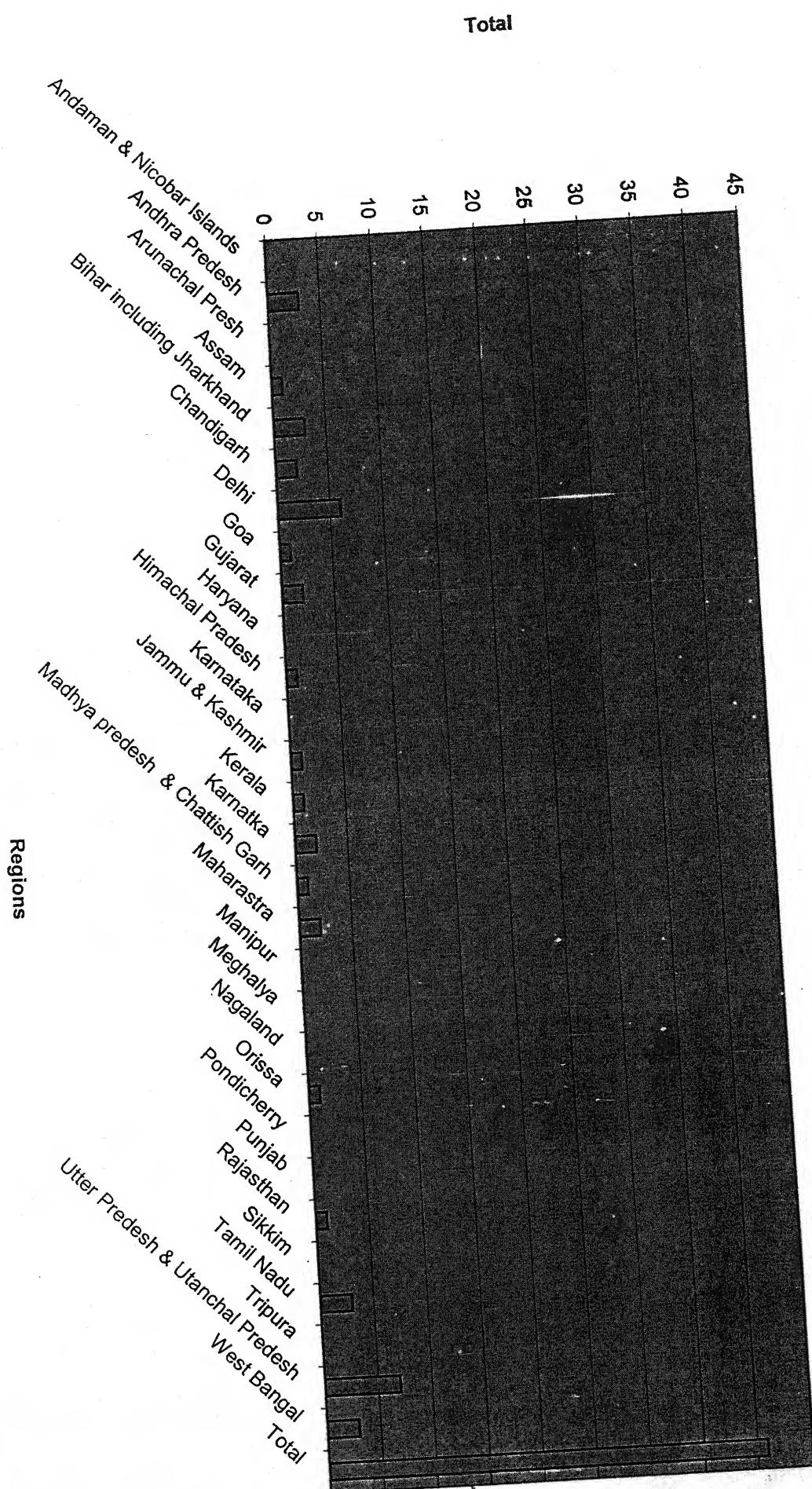


Table 2.4 ICMR Research Institutions in India in the field of S&T. (Data based a per the Directory of R& D Institutions (1999) published by DST and University Handbook (2001) published by AIU,Delhi.

Name of the State /UT	Total
Andaman & Nicobar Islands	1
Andhra Predesh	3
Arunachal Presh	0
Assam	1
Bihar including Jharkhand	1
Chandigarh	1
Delhi	4
Goa	0
Gujarat	1
Haryana	0
Himachal Pradesh	0
Karnataka	1
Jammu & Kashmir	0
Kerala	0
Karnatka	1
Madhyapredesh & ChattishGarh	2
Maharastra	5
Manipur	0
Meghalya	0
Nagaland	0
Orissa	1
Pondicherry	1
Punjab	0
Rajasthan	1
Sikkim	0
Tamil Nadu	3
Tripura	0
Utter Predeesh & Utanchal Predesh	1
West Bangal	1
Total	28

ICMR Research Institutions in India in the field of S&T

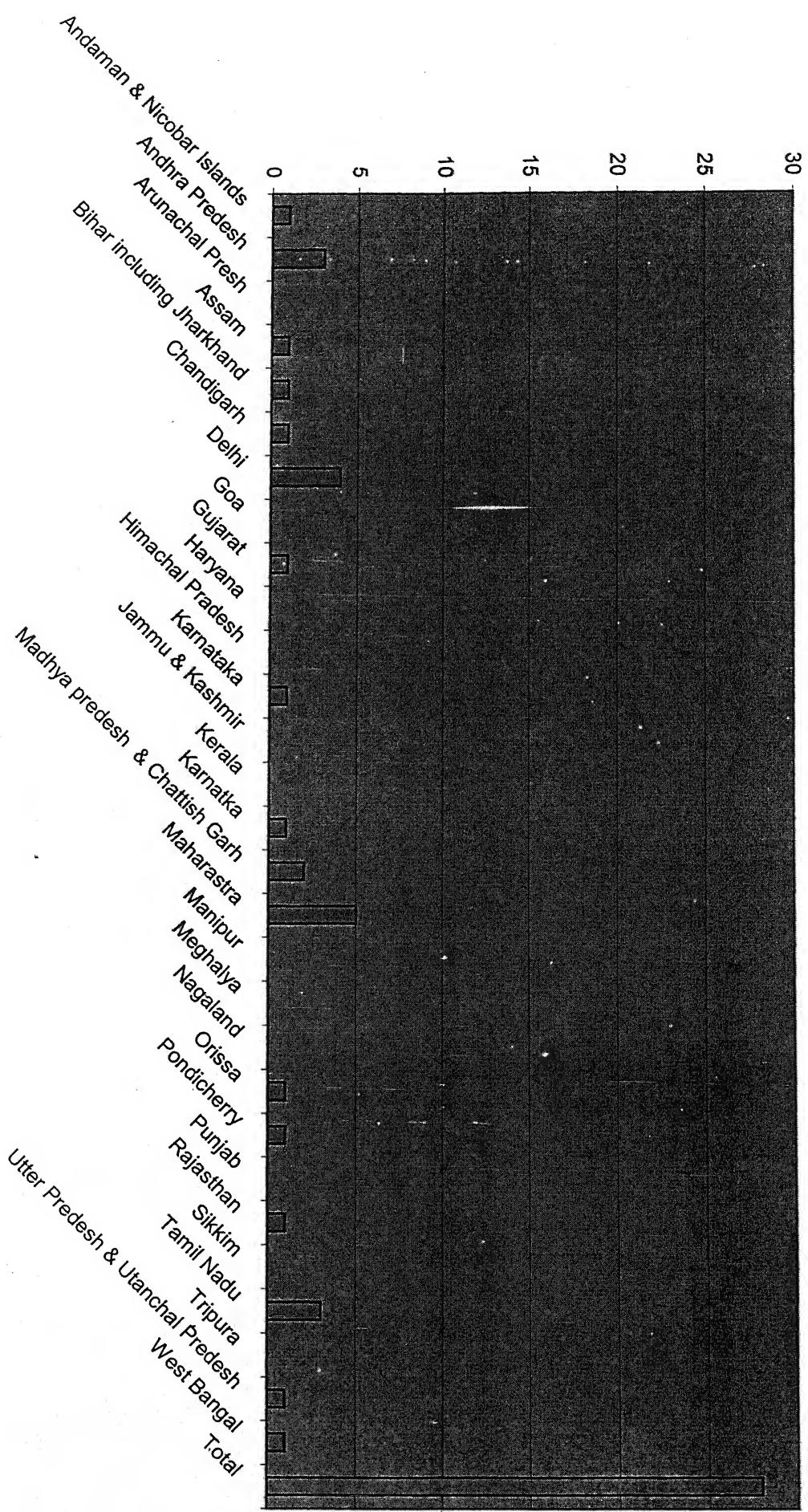


Table. 2.5 ICAR Research Institutions in India in the field of S&T. (Data based a per the Directory of R& D Institutions (1999) published by DST and University Handbook (2001) published by AIU,Delhi.

Name of the State /UT	Total
Andaman & Nicobar Islands	1
Andhra Predesh	8
Arunachal Presh	1
Assam	0
Bihar including Jharkhand	2
Chandigarh	0
Delhi	5
Goa	1
Gujarat	3
Haryana	6
Himachal Pradesh	4
Jammu & Kashmir	1
Kerala	5
Karnatka	5
Madhya predesh & ChattishGarh	4
Maharastra	6
Manipur	0
Meghalya	2
Nagaland	0
Orissa	3
Pondicherry	0
Punjab	1
Rajasthan	5
Sikkim	1
Tamil Nadu	3
Tripura	0
Utter Predeesh & Utanchal Predesh	15
West Bangal	3
Total	83

ICAR Research Institutions in India in the field of S&T

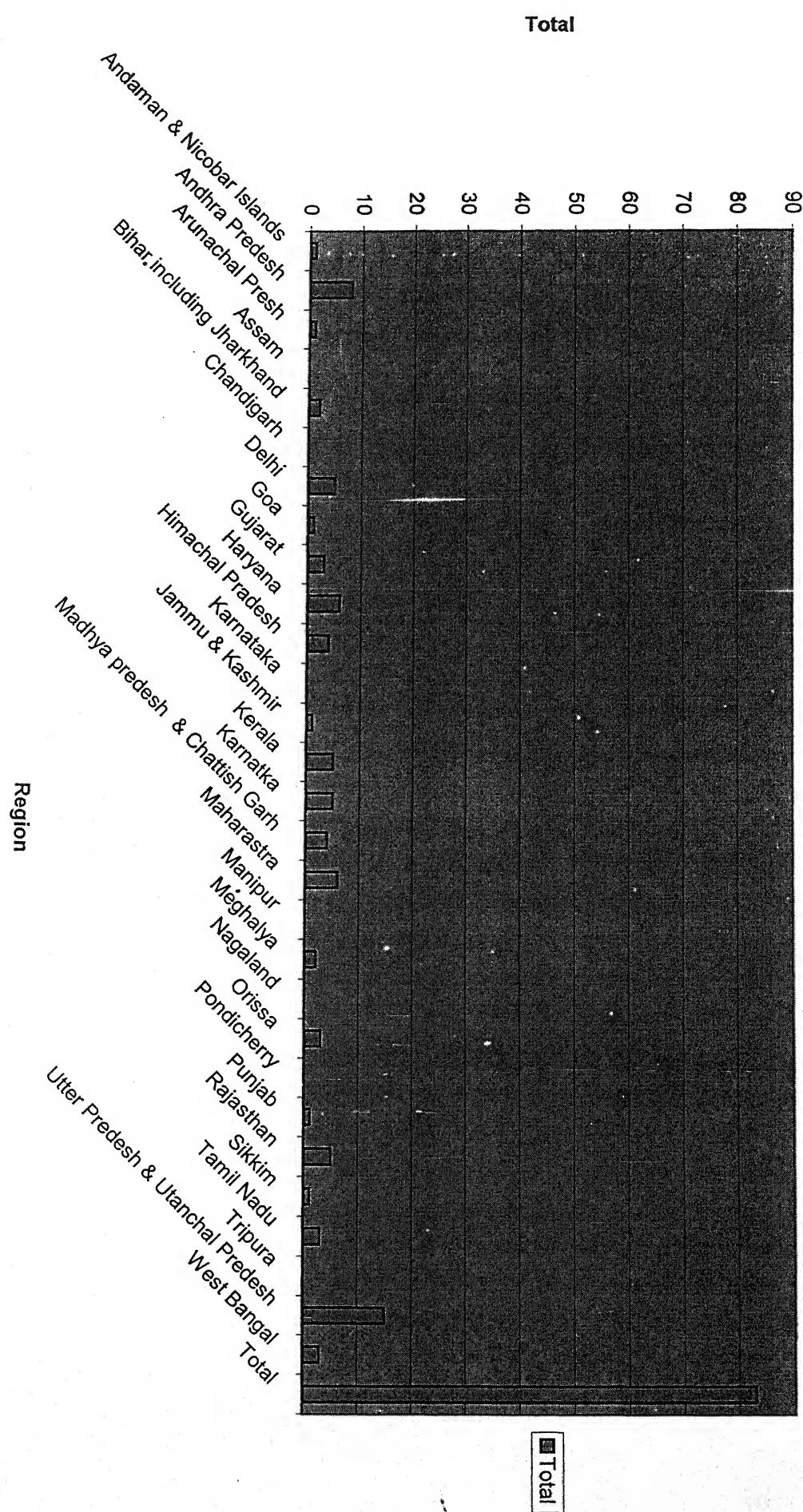


Table. 2.6 DRDO Research Institutions in India in the field of S&T. (Data based a per the Directory of R& D Institutions (1999) published by DST and University Handbook (2001) published by AIU, Delhi.

Name of the State /UT	Total
Andaman & Nicobar Islands	0
Andhra Predesh	7
Arunachal Presh	0
Assam	1
Bihar including Jharkhand	0
Chandigarh	1
Delhi	14
Goa	0
Gujarat	0
Haryana	0
Himachal Pradesh	1
Jammu & Kashmir	1
Kerala	3
Karnatka	10
Madhya predesh & ChattishGarh	2
Maharastra	10
Manipur	0
Meghalaya	0
Nagaland	0
Orissa	2
Pondicherry	0
Punjab	2
Rajasthan	1
Sikkim	0
Tamil Nadu	3
Tripura	0
Utter Predesh & Utanchal Predesh	7
West Bangal	2
Total	67

DRDO Research Institutions in India in the field of S&T

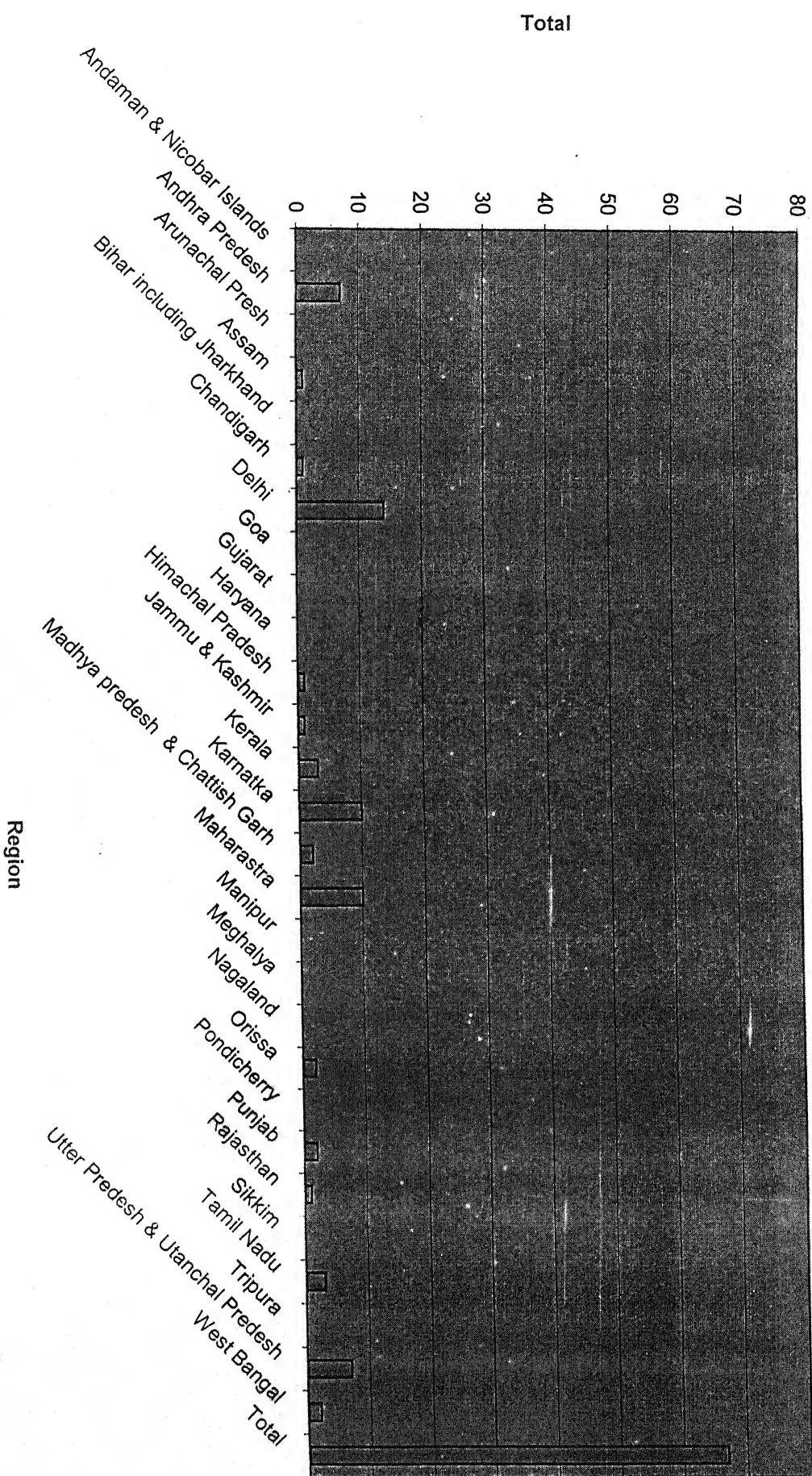


Table. 2.3. Libraries and Documentation Centers of the Academic and Research Institutions in Delhi region in the field of S&T undertaken in the study.

(Data based a per the Directory of R& D Institutions (1999) published by DST and University Handbook (2001) published by AIU,Delhi.

Region	University Institutions	CSIR Labs	ICAR Lab	ICMR Labs	DRDO Labs	University Affiliated Institutions	Others	Total
Delhi	6	5	4	3	13	42	4	77

The association of Indian Universities (AIU), University Grant commission (U.G.C) Central Advisory Board of Education (CABE), Indian Council of Agricultural Research (ICAR), Council of Scientific and Industrial Research (CSIR), Indian Council of Social Science Research (ICSSR), The All India Council for Technical Education (AICTE), National Council of Educational and Research and Training (NCERT), The State Councils of Higher Education, National Council of Teacher Education, Bar Council Of India, Medical Council of India, Council of Architecture, Dental Council Of India, Pharmacy Council Of India, Sports Authority of India and the Indian Nursing Council are some of the coordinating bodies vested with power to regulate standard of academic performance in their respective disciplines. Each University Institution is having a Library systems. Central Library is the main constituent part of each such system. The main objective of the university library is "Maximize the exposure of library users to the universe of bibliographic resources". The functions of all university / academic libraries are essentially, to acquire sources of information, (bibliographic material, printed, digitized) to the intrust of users population, to organize and display these material in various ways and to make them available to users.

Generally, each academic or Research Library is having following main divisions:

- Acquisition Division,
- Processing Divisions,
- Computer Application Division,
- Readers Services Division,
- Serial Division,
- Administration & maintenance Division

Each division is having a set of rules , procedures, jobs. Following are the main tasks & activities of each divisions of a library systems:

2.5. Use of Information Technologies (IT) in S&T libraries:

The developing countries have already reached to a stage where technology, specially computer and communication technologies, threaten the very existence of traditional libraries. In the present scenario any individual, rather than visiting a library, might be available to search the files electronically such as OPAC, Library bulletin board services, CAS, SDI, Library home page services, Full text online journals etc. and receive a printout of specific information or facsimile copy of a desired document. So far as the situation of the libraries in the electronic world is concerned, the libraries still have the important role to play to collect catalogue, negotiation of use of full text online, orientation to the users for the use of such material, and indexed materials for the interest of Library users. In addition to the house keeping activities, some of the libraries are using the computer network for resource sharing purposes using e-mail, FAX, LAN, and Internet attached to the system. LAN in libraries will have an increasing important role in developing effective library and information services within and between libraries. Internet offers e-mail, News group, FTP, Telnet, Gopher, WWW. Now some of the libraries are using Internet in :

- Acquisition -Ordering publication etc.
- Cataloguing, Classification,
- Remote access to information,
- Access to online full text journals books etc.
- CAS
- Reference services,
- SDI

Cost effectiveness, cost benefits, various opportunities, and competitive advantages of IT (external environment) have created a heavy pressure to change on these S&T

libraries. To respond such competitive advantages, librarians are also facing a threat like situation. The main threat facing such libraries are:

- For arranging sufficient fund for acquisition of such technologies,
- Installation,
- Maintenance,
- Use,
- Manpower training,
- Employee resistance,
- Management perception etc.

The threats resist the change or brings Static's. Inspite of this fact that these technologies have brought unlimited opportunities for these libraries, it is observed that their adoption by S&T libraries varies from library to library. Some of them are in advance stages of Change (Use of these technologies). Others are in very initiative stage of planning to change. The purpose of this study is to understand the factors responsible for change in S& T libraries and Information Centers. There are many driving forces - *physical or psychological that acting on any field for bringing change in the systems and makes the things different and affecting alterations in techniques, practices, and procedures to meet various pressures and challenges.* On the other hands there are also some static forces which *showing no change, or lacking development, movement or vitality due to various inhibiting factors (threats - physical as well as psychological).* On the other hand the Static organization are less responsive to such advances / pressure of change. They resist the change (static).

In a dynamics organization - I) the physical factors may be new technologies, tools, and techniques etc., ii) the psychological factors may include the organizational culture & values, management attitudes, and perceptions etc. Success in adoption of any technology,

and engineering- based efforts (external environment) depends on a broad understanding of the interactions and interrelations that occur among the components of a large systems of human (organization) and machine (external environment).

The interactions and interrelations that occur among the components of an organization exerts pressure to change. The pressure of change are always present in the form of opportunities and threats. At any point of time the significance of these pressures will vary markedly from organization to organization. Some of the managers may be aware of these aware of such opportunities or threats and seek to respond positively. Some of the managers may recognise opportunities and threats but choose to do little to just avert crises. Some managers are totally unaware of the opportunities and threats. A lack of awareness can mean that potential good opportunities are lost. It is therefore vital that managers are strategically aware both of potentially threatening developments and of opportunities for profitable change, and that they seek to match and improve the fit between the environment and the organizations resources. Any organization improves its chances of strategic success if it can successfully relates its culture, values and style of management to the environment in which it competes. Whilst all business must react to pressures from the environment , some will be very proactive and thereby seek to manage their environment strategically. The environment , therefore dictate what are called key success factors - the factors that an organization really needs to address for long - term competitive advantage and strategic success. Such factors may vary from organization to organization and include risk, innovation, services & technology change orientation.

Good management prepares functional strategy to make their library maximum flexible to adopt such new advances for competitive advantage. Strategic management is the process by which an organization establishes its objectives, formulate action to achieve these objectives in the desired time scale, implement the action and assesses progress and result.

Such management creates a unified team of people and a Management Information System (MIS) to achieve the agreed objectives within the required time and with economy in the use of resources. One important method is the SWOT(Strength, Weakness, Opportunities & Threats) analysis. The organization 's resources (its strength and weakness) are evaluated along with the external environment (the sources of opportunities and threats) before finalizing the objectives and strategies.

There are several key factors responsible for such variations. These factors include risk, innovation, technology, distribution, or change orientation, values, attitudes, culture, perception, orientation. Some of the S&T Libraries environment offer more opportunities for the risk take (Dynamic). Other more stable libraries may be more resistant to change (Static factors). In this study efforts are made to explore the key variable factors (both dynamic and static) in adoption of new information technologies including MIS by the managers of S&T libraries and Information Centers.

The basic goal of an S&T Library or Information Center is to meet the challenges of providing the increased access to the relevant knowledge base to its users community which mainly includes the Scientists, technologists doctors, researchers, the industries and beyond. The library exists as an interface between the universe of knowledge and a particular user population. The overall objective of the library is to make the universe of knowledge with "Maximize the exposure to library users to the universe of bibliographic resources". The functions of all libraries are essentially , to acquire, sources of information, (bibliographic material) to the entrust of users population, actual or potential, to organize and display these material in various ways and to make them available to users. Like in business and service organization, Information Technology (IT) has also created a revolution for libraries. For Librarians IT has opened the new application areas with great promises, high expectations

and unimaginable dimensions, specially in management and processing their main function - accessing the information, organizing, and retrieving it. The Information technology has:

- Minimized the distance by accessing the information online from far flung distance through INTERNET.
- Solved the space problems in the Library. Now million of pages may be stored on a small piece of Computer chip, Computer data bases, CD/ DVD-ROM disks etc.
- Provided Cost effective and cost benefit solution for accessing more and more information. Today we may have access to the several web sites containing sea of information of interest including complete Archives / back files of full text online journals, conference proceedings, patents, standards etc. Many of such web sites are accessible free of cost and others are accessible on license agreement basis or through subscription models with print version. Few of the examples are accessing all the more than 1100 full text online journals of Elsevier Science (Print cost more than Rs. 70 Crores) just by signing a License agreement of few Lacs. In the same way the IEEE & IEE Electronic Library(IEL) is a full text Online Library containing more than 32% of the total world literature in the field of Electrical, electronic , computer and control engineering which includes 13 years back files of all the IEEE & IEE journals, standards conference proceedings and patents. Now a days majority of publishers are making their journals available full text online.
- Expedited the dissemination of information by retrieving it from a very huge collection of data referring through millions of records within an astonishingly reduced and short time.
- The Govt. Policies are pulling libraries towards adoption of Computer based System. India is one of the leaders in Information technologies. It is moving very fast towards a universal access to Internet and with a flood of I T applications encompassing every facet of human life. The existing over 600,000 Public telephones, PCOs are transforming in

to Public tele info centers / Internet surfing. As given in the Interim report " IT Manpower: Challenge & Responses", Hindustan Times, Jan.19, in the next seven years, the report proposes to spent Rs. 2000 crore (central fund alone) , a mere 200 Crore a year (equivalent to around 1% of what the country earns from software and services), follows the programme laid out in the Interim Report of the Task Force on Human Resources Development. It says, India should emerge as a top notch IT- provider in the coming few years. As on March, 31, 2000, there were 3.4 Lakh software professionals in India; 80% of them had Engineering degrees and 12% sported Diploma and certificates from private training institutions. Seven years hence, the IT industries in India will be worth \$1000 billion and be the single largest contributor to the Gross Domestic Products (GDP). To man this burgeoning industry, the country will require a staggering 22 Lakh IT professionals. Besides Indian professionals would be increasing be required to cater to international demands. As far expending IT education, the task force prefers interventions contingent upon the situation parameters: 15 Category first institutions (the IITs, IIMs, and IISc, Bangalore) for focus on PG programmes. 50 Category II institutions (RECs) for a focus on UG programmes, and 200 Category III (Government) institutions and 550 Category III(Self financing) institutions for upgrading engineering and IT education. As per the report " the total intake of 2.05 Lakh students in engineering and technology with IT programmes, the action plan aims to double the intake in the next academic years and triple by 2003 - 2004. These new information policies of Government are pulling libraries towards computerization.

- Most of the University institutions began to use the **Web based Teaching & Learning**. In developed countries, the educational institutions have gone beyond the physical boundaries of conventional class room and laboratory to a virtual class room and simulated laboratory situation, leaving physical campus to virtual campus, by wider

perspective of student body. The students are also demanding more and more Computer based Information services in libraries under such Web based teaching and learning.

Using such web based libraries, the students can access:

Course materials through internet.

CD based video support.

Tutor support to students through internet.

Contact programmes organised at identified study centre.

Web access through dial up connections, internets, Cable modems etc.

Learners send their queries to the tutor through internet.

Mode of evaluation through study centres and Internet respectively.

The teacher responds to the queries of students/learners sitting in computer laboratories.

Sends assignments.

The teacher receive complete assignments on the dates from the students and sends corrected assignment back to the students.

Organises Internet Chat room discussion, contact sessions, etc.

Provides feedback to students and course co-ordinator on curriculum / instructional material, fast access queries (FAQ) etc.

- IT environment. Educational institutions even middle and high schools are going to be more and more IT environment.
- Easy Access to WORLD WIDE WEB (WWW OR WEB). The WWW or Web uses text, graphics, interactively and to extending to video & audio. These characteristics make the Web most useful when used to explore intellectual and verbal knowledge and to a lesser extent when exploring effective learning with its versatility and interconnectedness. The web offers one of the most effective learning with its versatility.

The web offers one of the most effective ways to work with learners. It is easy to collate

and put information on the web. The WWW is the most popular prevalent INTERNET applications. Once a WWW site it needs to be transferred on to a server that has a WWW server software program and is permanently connected to the INTERNET, so that such information is always available to the potential users. The INTERNET can be considered as a huge semi - structured data base containing enormous amount of information. It provides a unified electronic publishing platform by using Hypertext Markup Language (HTML). The HTML is a tagging convention for displaying information contained in a specially encoded text document. The Web is primarily a hypermedia publishing platform. The basic document of the Web is called home page. A name serves to identify the host logically independent of its point(s) of attachment to the network(s). The same host may have server names . An address identifies a point of attachment for purpose of delivering data to the host. The router uses the addresses to determine how to forward the packets onward.

A library can create their own Web site to make their library information available on INTERNET through such Web site. In a given Web site there may be a single page to a million of pages search able through Indexes etc. Through the Uniform Resource Locator (URL) a browser is able to locate a designated resources. The URL is the uniform addressing scheme of the Web. The instructions contained in a WEB page can include hyper link to other Web pages. Because the Web permits multimedia, including sound, video, virtual reality, and interactive programming, all forms of traditional media are represented on the Web. A Web browser is the client side of the Web. The Web uses a data access protocol called Hypertext transfer protocol (HTTP). The browser uses the HTTP to request documents from server using URL. The browser then sends an HTTP request header to the server. The server then sends a HTTP response header which discusses the status of the response, and then the actual data are sent. With the help of

search Engines or Directory services the information available on a particular Web can be found. All the search Engines do keyword searching against a database. The Search Engines use Web software agents known as spiders or robots or crawlers to automatically gather information from the Web sites. The INTERNET including the WWW, is essentially for communication and information exchange among interested parties across the globe. The interested parties may be individual consumers searching relevant information or business attempting to sell and advertise their products or information to potential consumers using WWW as the communication medium. The popular applications of INTERNET are e-mail, file transfers, and remote terminal access using telenet. The governments, publishing companies, Library and database services, Educational uses, community services, e- commerce, Interactive chat, Interactive games, and telephony are also some of the specialized directories in INTERNET.

- The national and International bibliographic databases are creating a base for computer based information system in libraries.
- The Resource sharing & Consortium concepts are being adopted by libraries.
- The neighbouring libraries are being computerized.
- The cost of hardware and software is decreasing
- Library schools are producing library professionals with specialization in Computer and management techniques.
- The Academic libraries are now using the library networks.
- The complex work environment in academic libraries demands computerization as quickly as possible.

CHAPTER - 3

REVIEW OF THE RELATED LITERATURE

The Literature Survey gives an overview of the of the litrature related to the areas of IT application in libraries and the factors potentially affecting the IT movement in libraries and information centers in the field of S&T. The litrature indicates that there has been a steady movement introducing IT in to information storage and retrieval for both traditional and new areas of application. The litrature points conclusively that the movement of IT application in will not depend only on the technological change in the hardware and software but also on the current data processing environment in the libraries. The litrature also includes a few surveys conducted to investigate the computer application in libraries. These surveys did not, however, go beyond the the description of current practices. This survey attempts to explore the litrature related to the current trends in the light of the current situations in libraries and their status of their data processing affairs.

3.1 An Overview:

In order to define the criteria for the study of "*Information Technology (IT) in libraries of Science and Technology (S&T) organizations. A comparative study of selected libraries of Delhi*". a review of relevant literature is undertaken. The literature survey is divided in to two parts. In parts A , the literature related to the S&T libraries mainly its : i) Goal and objectives, ii) its Management, iii) Management process, iv) Information systems in S&T library, v) Systems approach, vi) factors of success and failure of Information systems , v) Change in the management in libraries, vi). Its Organizational resources, & organizational culture, vii). New information technologies, viii). Concept of SWOT Analysis in the management of S&T libraries, and v). Design and development of Information systems for information storage and retrieval.

Since the subject scope of IT application in S&T libraries is of highly interdisciplinary nature and secondly there is very few literature covering IT use in libraries , therefore, in addition to the Library and information Science Abstracts (LISA), the other sources of literature for the purpose of study were also used. Some of the sources were : a) Information Science Abstracts, Plenum Publications, New York covering IT related literature from 1980 to June, 1994. b) CD-ROM Search of Compendex Plus covering literature from 1985 to June, 1994. Besides, the other literature sources such as relevant references quoted : a) in the Encyclopedia of Management, b) Encyclopedia of Computer Science and Engineering. (both Published by Van Nostrand Reinhold Co., New York.), c). Wiley Encyclopedia of Electrical and Electronic Engineering, 1999, John Wiley and Sons, Inc, New York, d). b) Encyclopedia of Computer Science (2000) Nature publishing group , London, e) Various Journals including Electronics one, technical reports, review articles, and d). many other classic books, research dissertations etc on management sciences etc. For reference and literature survey the various libraries located in Delhi mainly, the Central Library of IIT, Delhi, & National Science Library of INSDOC, New Delhi were used.

Literature survey of the following online resources were also made:

<http://browserwatch.internet.com/>

AltaVista (advanced) <http://altavista.digital.com/>

<http://www.altavista.digital.com/av/content/about-our-story.htm>

Infoseek Ultrasmart <http://infoseek.com/>

AltaVista (advanced) <http://altavista.digital.com/cgu-bin/query?pg=ac&what=web>

OpenText <http://index.opentext.net/>

Excite Search <http://www.excite.com>

HotBot <http://www.hotbot.com/>

Webcrawler <http://www.webcrawler.com>

Lycos <http://www.lycos.com>

Meta and Multi Search Engines

Savvy Search <http://guraldi.cs.colostate.edu.2000>

Savvy Search serch from <http://guraldi.cs.colostate.edu.2000/form>

Metacrawler Multisearch

Dogpile <http://www.dogpile.com>

Inference Find <http://www.inference.com/find/>

Profusion MetaSearch <http://www.designlab.ukans.edu/profusion/>

Highway 61 Multsearch <http://www.highway61.com>

Beaucoup 600 Search Engines

Mumma Mother of All Search Engines <http://www.mamma.com>

Cosmic Mother Load Insane Search <http://www.cosmix.com/motherload/insane>

WebSearch MetaSearch <http://www.web-search.com:80/>

CNETs Search.com Multi-Search Page <http://www..search.com>

Webreference Search Engine page <http://www.webreference.com/search.html>

Specialized Search Engine

AT1 Database search: The invisible web <http://www.at1.com/>

Edirectory search engines from around the world <http://www.edirectory.com/>

Muscat EuroFerret European Site Search <http://www.muscat.co.uk/euroferret/>

International Regional Search Engines <http://searchenginewatch.com/regional>

Search Net Happenings <http://www.mid.net:80/.NET/>

Inquiry Com Information Technology search <http://www.inquiry.com>

Mediafinder <http://www.mediafinder.com/custom.cfm>

Internic's Whois Domain Information <http://ds.internic.net/wp/Domain>

Study Web Research Site <http://www.studyweb.com>

Library of Congress Search <http://leweb.loc.gov/harvest/>

FindLaw Legal Search <http://www.findlaw.com/index/html>

Legal Search Engines <http://www.uklaw.net/lawsearch.htm>

InfoMine Government info search <http://lib-www.ucr.edu/search/ucr-govsearch.html>

HealthGate Free Medline <http://www.healthgate.com/HealthGate/MEDLINE/search.shtml>

Medical Matrix Medline Search <http://www.medmatrix.org/infor/medlinetable.html>

Four11 People <http://www.four11.com>

Forum One Forums <http://www.dejanews.com>

Liszt Mailing Lists <http://www.liszt.com>

Companies <http://www.companiesonline.com/>

Edga <http://www.sec.gov/edaux/searches.htm>

Directories

Yahoo (directory) <http://www.yahoo.com>

Yahoo Search Options <http://search.yahoo.com/bin/search/options>

Magellan (directory) <http://www.mckinley.com>

Magellan Search Options

Galaxy Professional Directory <http://www.einet.net/>

Galaxy Adv. Search <http://www.einet.net/cgi-bin/wais-text-multi>

Lycos A2z Internet Directory <http://a2z.lycos.com/>

Infoseek Directoy <http://www.infoseek.com/>

Nerd World subject Index <http://www.nerdworld.com>

Jump City (+newsgroups) <http://www.jumpcity.com/list-page.html>

Your Personal Net <http://www.ypn.com/>

Starting point <http://www.stpt.com/>

Suite 101 <http://www.suite101.com>

Brint: A Business Researchers Internest <http://www.brint.com/interest.html>

Martindal's REference Centre <http://www.sci.lib.uci.edu/~martindale/Ref.html>

The Mining Company subject Site Guides <http://www.miningco.com/>

Top Site and Award Directories

Lycos Pointcom Top 5% <http://www.pointcom.com/categories/>

Netguide Live (go to Best of the Web)<http://www.netguide.com>

Librarian Guide : Best Info on the Net <http://www.sau.edu/CWIS/Internet/Wild/index.htm>

Looksmart Directory <http://www.looksmart.com>

NBN News Editor ChoiseAwards <http://nbnews.com/>

Web Scout Best Link <http://www.webscout.com>

Cnet's Best of the WEb <http://www.cbet.com/Content/Reviews/Website/Pages/Ws.categories.html>

Roadkill Caf's 175 Great Sites <http://www.cakwev,cin/-roadjukk/great.html>

Digital Librarian Best of the Web <http://www.servtech.com/public/mvail/home.html>

Top Web Site Lists

Web21 100 Hot Web Sites* <http://www.web21.com/>

The Web 100 <http://www.web100.com/listings/all.html>

WebCounter Top 100 <http://www.digits.com/top/both-100.html>

Zenation's Top 100 <http://www.zenation.com/loto.htm>

WebSide Story Top 1000 <http://www.hitbox.com/wc/world2.html>

Ziff-Davis ZDNET <http://www.zdnet.com> CNET <http://www.cnet.com>

3.2 Basic Goal of S&T Library:

The importance of S&T library system in the process of education and research has been established and acknowledged since long. The library exists as an interface between the universe of knowledge and a particular users population. The overall objective of the library is to make the universe of knowledge maximum accessible to its users. Hemberg, M. etal. (1974) stated library objectives differently "Maximize the exposure of library users to the universe of bibliographic material) to the entrust of users population, actual or potential, to organize and display these material in various ways and to make them available to users.

Ranganathan (1957) discussed these objective of libraries through its five laws of Library Science. These are:

1. Books are for use.
2. Every reader his/her book.
3. Every book its reader.
4. Save the time of the reader.
5. The library is the growing organism.

This first law implies the entire concept of the library as an interface between users and bibliographic resources, the second to accessibility and third implies to the exposure, in the fourth law indication is towards internal efficiency of the library and the fifth law is concerned with the growth of knowledge resources in varied forms and in varied dimensions. These fourth and fifth laws indicates towards the management aspect of library.

3.2.1 Information System in S&T Library

Radford has devided the information system for an organization in to two categories. These are the internal information systems and the strategic information systems. The Internal Information System includes the operation of an organization. This also includes Electronic data Processing(EDP) and it involves repetitive processing of routine data. These are meant for providing information support to administration of resources and conduct of operations. Basically these systems are designed for satisfying the information needs of junior and middle level managers. The output of these systems is also useful to the top management for budgetary control as well as strategic decisions based on past performance.

The Strategic Information Systems is mainly concerned for the external information. Such information is required by the top management to set priorities, develop overall corporate strategies, initiate programs, and establish corporate goals. This is a blend of summarized internal and detailed external information.

To accomplish the goal of a S&T library and its organizational structure is the one that provides a system through which people can perform their assigned activities. This structure in a library is highly complex one as there are many activities are to be performed by many people of different skills and attitudes. It contains internal as well as external environments, varied resources, different libraries, norms, values, roles, policies, rules,

standards, etc. Gopinath (1990) equates the library with any modal business organization where management tools, techniques, procedures, theory and principles are applied. To get these activities performed through people is the job of the managers. In this complex organization the managers are at three levels. These levels in the academic library satisfy the Anthony model of decision making.

3.2.2 Management Process in a S&T Library:

A process is defined by Oakland (1993) as the transformation of sets of inputs which can includes action, methods, and operations in to output that satisfy the users needs and expectations in the form of products, information services, or result/output. Every thing we do is a process. The output from a process is that which is transferred to some where to some one - the user. Library managers like managers in business organization have to make decisions in performing their management functions. Decision making is one of the most important tasks of managers and administrators in management of modern academic library. For decision making the relevant data is required. This data is collected, processed and made available to the managers. According to Evans (1976) the successful decision are the result of several factors. One factor is the information available. In the management process adequate, accurate, timely, data about the problem are collected, organized, and evaluated with the past situations. Based on some standards, criteria, experience, and research, a particular decisions is taken.

3.2.3. Cultural diversity and dynamics of Change in the Management of a S&T Library:

Cultural diversity may affect how an individual or organization relates to its environment, thereby influencing corporate strategy formulation (Schneider 1989), how negotiate agreements and joint activities with potential foreign partner (Grahm, / Mintu / Rodgers 1994), Tung 1991, leadership styles and managerial values (campbell / Bommer / Yeo 1993) , Ralston / etal 1993, Performance appraisals (Vance / McClainin / Boje / Stage 1992) , training (Li,1992), and management development (Richards,1991).

Successful organizations continuously look for ways to recognize and exploit cultural diversities apparent in a multicultural workforce to create an advantage based on cultural synergy is less common (Lolla / Davis 1991). Hoppe (1993) notes that professionals, despite their similarities, carry with them the (mostly invisible) norms of their country, as reflected in the country differences, uncertainty avoidance, individualism, masculinity.

3.2.4. Application of IT in S&T Libraries:

The concept of IT application in library information and storage was originated in 1968 and became the buzzword of almost all attempts to relate computer technology and systems theory to data processing mainly in the business environment. Though application of computer in libraries was first time demonstrated successfully in the late 1950's and right from the beginning of 1960's many librarians in the west and a few in the east took matter of computerization of library operation rather seriously. Remarkable of them are:

- In 1959 Dr. H.P. Luhn of IBM demonstrated first time that indexing could be mechanized. The repeat publishing in the books " Keyword to context Index for technical literature) KWIC Index), York Town, Height (NY), 1059.
- On 6th April, 1960, American Chemical Society (ACS) brought a sample issue of the first automated periodicals called chemical titles.
- In 1963, Gilbert (WK) submitted his survey report on the automation of Library of Congress which resulted in the development of MARK - I format.
- In 1964 National Library of Medicine, (USA) brought out Index Medicos using Computers.
- In 1967 ACS ahead with Computerization of activities providing concrete indication of chemical compounds and their biological activities.
- In 1968 again ACS again proceeded CA Condenses covering full range of document abstracted in chemical abstracts.
- The creation of computerized data base here after went on unabated. Attempts were on to access these databases online. In 1968 Advanced Research Agency of US Department of Defence achieved success in online access of database.
- In 1970 the National Library of Medicine of US initiated MEDDLERS which became online in the name of MEDLINE afterwards.

- During 1970's the remarkable efforts were made at national and international levels towards evolving a common communication format suitable for interchanging bibliographic data not from one organization to many but among various organization in the world. Common Communication Format (CCF) of Unesco was the one example.
- The use of computer in Indian libraries may be traced to 1960's at INSDOC, New Delhi and DRTC, Bangalore. INSDOC presented the union list of serials using IBM 1602 (Raizada, 1964).
- As reported by Neelamgham (1968), in 1967 INSDOC compiled a Rooster of Scientific translations using IBM 1602 and later produced a keyword index to Indian Science Abstracts using IBM 360/44.
- Kamath (1990) in his survey, reported that in 1970 National Aeronautical Laboratory (NAL) library, Bangalore experimented computer in libraries using ICL 1004 system for circulation control. By 1970, there were 9 libraries in India using computers in their selected operations.
- Roy (1989) reported that on 80's some libraries and information centers began the use of computers. Special efforts were made by library organizations like ILA, IASLIC, and GILA to promote automation. They organized conferences, workshops, Seminars, and training programs. NISSAT financed organized the several training program in the application of CDs/ISIS software. As a result bibliographic databases were produced in the several libraries in India.
- Srinivasan (1987) has sown the growth of application of Computer in Indian Libraries.
- It was 1980 when some literature emphasizing the use of computer-based MIS in libraries began to appear in research journals, Abstracts and Indexing journals.
- In 1991 Tim Berners -Lee , produced Internet first browser. According to him the dream behind this was to scan any document, picture, graph, photo or Video on Internet and share the resources by an individual on mutual basis. Now, the Internet has emerged as the most powerful medium for storage and retrieval of information. It works round the clock and connect every nook and corner of the globe.
- In 1999 Bill Gates (Penguin Books , London 1999), announced that the now all kind of information , numbers, text, graph, sounds, video can be stored in to a digital form and forwarded or access through Internet.

- The newest media available on Internet is the world wide web popularly known as WWW. It is a huge collection of interconnected hypertext documents, which contains links to other documents, files and sites on the Internet.
- In Library and Information Science Abstracts (LISA) the total article published on Computer-based MIS appeared in the Journal of repute up to July, 1994 were 78. Out of this 27 were relevant to the library application. In the year 2000 (Winter) it reached to the 122. Out of the 122 abstracts in LISA plus, more than 90 abstracts were of direct relevance to the libraries. This may be shown in the table as given below:

Table: Articles abstracted in LISA (Source: LISA Plus, (CD-ROM), Bowker Saur. July, 1994, 1998, 1999, 2000.)

	Year	Year	Year	Year	Year
Keywords/subject	2000(Winter)	2000 (Autumn)	1,999	1,998	1,994
Management	31997	31325	29932	28856	2779
Systems	32629	32205	31692	30870	3996
Information	113870	111888	108237	100496	22158
Computerization	21852	21432	20380	19329	2277

Some remarkable library literature on IT application in libraries is given as below:

- i) Boland, R.D. "Tutorial on Management Information System, Library automation as source of Management Information, paper presented at 1982 Clinics on library application of data processing, April, 25-28, 1982. Ed. F.W. Lancaster (University of Illinois, 1983, 10-26.
- ii) Chorba, R.L. and Bommar, M.R.W. "Developing Academic Library Decision Support Systems " Journal of the American Society for Information Science, 324 (1) 1983, 47 - 50.

- iii) Clark, A and Crorun, B. Expert Systems and Library Information Work: Journal of Librarianship, 15(4), Oct., 1983, 277-292.
- iv) Dubey, Yogendra, P. Decision Support Systems in the management of resource sharing Networks. Information Technology and Libraries, Sept, 1984, 245-254.
- v) Evans, G.T. and Bialy, A. A library Information Management System in a multi campus environment: Library Automation as source of Management Information, paper presented at the 1982 clinic on library application of data processing. April, 25-28, 1982 ed.F.W. Lancaster (University of Illinois, 1983) 164-96.
- vi). Hamberg, M. et.al. "A System approach to library management : Journal of System Engineering, 4 (1976), 117-29.
- vii) Heindel, A. J. and Napiars, H.A. Decision Support Systems in Libraries, 72. (1981), 313-27.
- viii) Morris, C.M. "Information for Decision Making" ASLI*B Proceedings, 36(11/12) Nov., 1984, 411-414.
- ix) Runyoj, Robert, S. Towards the development of a library management information systems. College and Research Libraries. Nov., 1981, 538-548.

In the beginning of 1990's the literature related to the modern concept of system theory, the Total Quality Management in libraries were also began to appear. Few of them are:

- i) Butcher, K.S. Total Quality Management. The Organ State University Library. Automation, 18(1/2) 45-46 (1993).
- ii) Organizational development and TQM: The Harvard College Library is Experience (Total Quality Management) Journal of Library Adminstration.18 (1/2) 29-44, 1993.

- iii) Hattery, M. "Librarians Communications in Electronics Age", *Information Retrieval and Library Automation*. 29(4) 1-2, Sept., 1993.
- iv) Ojala, M. How do you manage your Library in the 21st century? "Electronic Library", 11(3), 163-164, June. 1993.

3.3. Systems Approach:

Kindred (1993) Summarized the characteristics of System as follows:

Systems are made up of different parts or components. These parts are related and have definite interactions or interdependencies. A change in any of the components is likely to produce some sort of change in other components and in the system as a whole. All the components work toward some particular purpose or function which is the primary object of the systems as a whole. The system is usually a complex structure having diverse components such as person, ideas, materials, forces, procedures, and other factors. System may be a part of another large system, just as it is likely to be divided into many subsystems.

The Systems approach has been applied to diversified type of systems. However, for this study, the systems concepts is used as it applies to computer based system in libraries. The systems approach represents a valuable tool as philosophy to guide the study of organizations and their management and as a useful mainframe to aid the design of computer based system

Many authors (Atwood, 1977): Kanter, 1977: Raymond, 1990; Ahituv and Neumann, 1990) used the systems module to illustrate the system concept as it relates to the development of computer based system . Such module consists of five elements: input, processing, output, control and feedback.

Atwood(1977), defines each element as follows:

1. Input: Any thing which enters the system.
2. Processing: Any action upon the input.
3. Output: Whatever is produced by the processing of the input.
4. Control: The direction or adjustment to the processing.
5. Feedback: A measurement or indication of the quality of output.

Systems approach for the development of computer based system for S&T libraries Libraries means trying to access the whole library needs, rather than identifying some specific

information needs where the need for information may be most apparent. This implies that systems approach concentrates upon relationship of the whole system (Matthew's, 1971).

3.3.1. System Analysis:

The systems analysis approach is the analysis or design work start with the idea that the object to be studied must be viewed as a system. In relation to the development of a Computer-based system, the systems analysis is a comprehensive process and a very useful tool to guide the development of a particular system. The systems analysis work to determine the information requirements of any organization represents a crucial phase in the successful development of computer-based system. Samprevivo (1978) described systems analysis as the process of studying of the network of interactions within an organization and assisting in the development of new and innovative methods for performing necessary work. Similarly Cougar (1973) provided the following definition:

"Systems analysis consists of collecting, organizing, and evaluating facts about a system and the environments in which it operates. The objective of the system analysis is to examine all aspects of the system - the equipment's, personnel, operating conditions and its internal and external demands - to establish a basis for designing and implementing a better system".

3.3. 2. SWOT Analysis:

Strategy formulation is often referred to as strategic planning or long rang planning and is concerned with developing a corporate mission, objectives, strategies, and policies. It begins with situation analysis - the process of finding a strategy fit between external opportunities and internal strength while working around external threats and internal weakness.

In SWOT analysis a superior way of change may be suggested. To understand the dynamics of change in an academic libraries the SWOT analysis is adopted. The SWOT stands - S for Strength in an organizations, W for its Weakness, O for its Oppotunies, and T for threats in an organization.

In the Strength the main factor may be considered in the SWOT analysis of an academic library are diversity in Culture, Experienced top management, vertical integration, employee relations, international orientation. In Weakness the factors such as Process

oriented R&D, distribution channel, financial position, facilities etc. In Opportunities economic integration, demographics, economic development, trends. The threats may be Government policies, strong competition, users demand, new advancements etc.

Following six questions are used as base in designing tools for the SWOT analysis of the academic libraries under study:

Table 1. SWOT Analysis:

S.No.	Questions	Steps SWOT analysis
1	Where are you now	Step 1. SWOT s Present. Trend analysis
		Step 2. SWOTs Present. Present status
		Step 3. SWOT s Present .Present strategy .
2	Where will you be if you continue strategy	Step 4. SWOTs Future. Target,
3	Where do you want to be	Step 5 Gap analysis
4	What should be the overall strategy to achieve the short term and long term goals.	Step 6 Examination of options and strategy selection
5	What should be your overall strategy to achieve your short and long term goals?	Step 7. Strategy documentation and evaluation
6	How should you monitor your plan's performance	Step 8. Documenting and formatting the annual plan, policies.

3.3.4. Concept of Change management:

According to Ansoff (1995), Flexibility in Information Systems planning is the ability of planning systems to anticipate crises, identify opportunities, and adapt unanticipated changes. In figure 1 below, Sushil (2000) defined the flexibility as an exercise of free will or freedom of choice on the continuum to synthesise the dynamic interplay of thesis (flexibility) and antithesis (rigidity) in an interactive and innovative manner, capturing the ambiguity in systems and expending the continuum with minimum time and efforts.

The ranges of options created in the process can be mapped on the continuum ranging from the thesis to the antithesis. The type of Change mechanism or dynamic synthesis are created for continuous renewal and adoption. The freedom of choice can be identified in terms of various actors involved in problem context. According to Sushil (1997), the flexibility is the ability to change or react with little in time, efforts, costs, or performance. It implies openness in thinking, adaptive to the environment, responsiveness to change, versatility of action, non rigidity, multiplicity of process setting, freedom, liberalization,

informal attitude, autonomy of function, agility in actions, customized or tailor made solutions

The interactions and interrelations that occur among the components of a flexible organization exerts pressure of change (Dynamics) to get benefits of opportunities, whereas in a rigid organization a pressure is exerted to resist the change (static).

In the strategic management, there should be built in flexibility in the organization to allow adoption of information system process of new opportunities, i.e. The strategic management allow its managers total freedom on certain things, partial on some other, and rigidity on a few areas such as value systems.

3.3.5. Use of IT in S&T Libraries:

With the fast pace of technological changes affecting every known aspects of business, more so often in service industry, the S&T library can not remain aloof from the impact of such change. S&T libraries in India are also affected from such change impact. These libraries are adopting such changes in the management of their day to day activities. But, it is observed that the adoption of new advancement specially (IT) by such libraries in India is not uniform. Some S&T libraries are in advance stage of adopting such changes. The others are in planning stage.

Like any business organization, the change in the management of S&T library is also normal, natural, and inevitable, because its environment , both internal and out side is dynamic and there are many challenges and pressures i.e. factors and forces that causes change. These challenges are due to socio - cultural environment, technological environment, legal, political, government policies, linkages, etc. Strategic Changes may be categorised as below :

- Structural Changes: Includes changes in - job description, job design, basis of departmentalisation control mechanism, policies, procedures and practices, authority, business relationship.
- Technological Changes: Includes changes in tools, techniques, equipment's,
- Socio - cultural Change: includes changes in the attitude, perception, values, behaviours, skills etc. in an organization.

The study concern to the socio - cultural, & technological environment, of the S&T libraries available in Delhi state.

3.3.6. Socio - cultural environment: In a S&T Library the culture and values concerns to its readers, staff management, within library and management systems and procedures. The culture and values of the of an academic library are crucial for matching the organizational resources to its environment.

3.3.7. The technological environment: The information technology (IT) is composed of following technologies that enable the acquisition, representation, storage, transmission, and use of information.

Computer Technology

Communication Technology

Optical /Video (CD-ROM) technology

3.4. Factors of Success and Failure of IT application in S&T libraries.

The development of IT based Information System (IS) in libraries is complex and multi phased process. There are many factors that are required to be managed in order to avoid the failure the IS. The list of suggested reasons for the general failure of IS is well

documented in the literature (DeVBrander and Edstrom, 1977); Harzilinger, 1977; Hines, 1977; Lucas, 1973; McManis and Parker, 1978; Rymonds, 19990; Ahituv and Neumann, 1990). These are:

- Lack of information for decision making.
- Lack of familiarity with the system approach.
- Lack of top down design.
- Lack of hardware orientation.
- Human factors.
- Lack of users involvement
- Communication gap.
- Lack of qualified personnel.
- Lack of planning of IS projects

The development of IS must be managed and controlled by the managers of the S&T libraries. In order to accomplish this essential requirement, managers might apply commonly used management techniques, such as Gnatt chart, Program Evaluation and Review Techniques (PERT), or Critical Path Methods (CPM). In addition to the management control and evaluation of the progress of the development of the IS, it is very important that the designers of the IS should use appropriate methodologies to develop these systems.

3.5. Structure of a IT -based Information Systems(IS):

Arya-Marin, Adrin (1982) suggested the following components of a IT-based information system.

- Users: includes different levels of management and follows the hierarchy approach described by Anthony (1965).
- Procedures: includes the standards and necessary manuals used to access or request new reports and any additional manual to facilities the use of system.
- Data Processing management: includes all the data processing personnel.
- Hardware Components: includes the computer system used to support the Library Information system. It may be large, a mini, or a micro computer. Networking, Internet.

- Peripherals: includes the operating system, data base management system (DBMS), data dictionary software, etc.
- Software Components: includes the operating system, data base management system (DBMS), data dictionary software, application software, decision models software, etc.
- Data base: includes the common depository of data to produced the information needed by the users of the system.
- Data dictionary: includes the repository of information about data of institution.
- Decision models: Includes the integration of decision models software in to the system to expand the options to generate some specific reports for decision making.

CHAPTER - 4

CONCEPTUAL FRAME, DERIVATION OF HYPOTHESES & CRITERIA FOR EVALUATION.

The chapter aims at developing a suitable model for studying the extent of use of Information technology in S&T libraries of Delhi. The conceptual frame & Criteria for the evaluation of growth and development of IT in S&T libraries is basically developed on the basis of the review of the literature. This chapter gives a brief illustration about : Conceptual frame of study, derivation of hypothesis , the Model Criteria, Management Functions in an S&T Library, Matrix for Library Activities, levels of Management, Elements of Management Information, System design, Components of IT based Libraries, IT-based Information Systems (IS) Development Life Cycle.

4.1 Assumptions:

The basic assumption in this study is "that the extent of Information Technology use is determined by a set of organizational and personal variables". This assumption is based on the Social Engineering approach as described by Rice(1963), Marrow, et al. (1967), and .al. (1967), and Trist, et.,al. (1963). These authors contented that in an Organization there is an interaction between the two major factors; a) Technology, and b) the Organization and its Members. In planning or changing one factor has an effect on the other one. To study the use of IT in the given library systems the organizational factors and the Perception of the library managers about IT use are taken in to consideration.

The following information related to the Information Technologies are to be explored in the given S&T libraries:

- Extent of Library Computerization
- Hardware and Software used
- Bar-coding
- OPAC
- Networking
- Use of Internet
- Electronic journals
- Computerized information services
- Member of DELNET

The Organizational study & perceptual study of the libraries of the S&T libraries of Delhi state are to be undertaken

4.2. Variables

The important concepts (Variables) found to be associated with the use of IT are given as below:

A. Independent Variables

i) Organizational Characteristics:

Goal, Activities, Resources, Structures, Policies, Rules, Training, Culture, Management etc.

ii) Communication Behavior:

Communication Pattern, Information Seeking behavior, Linkages, etc.

B. Dependent Variables:

1) Extent of information technology use. The change is measured here by comparing the differences between the systems. Differential exposure and intake of modern library services and practices leads to differential change in S&T libraries. With this basic premise of different aspects of change in the library services and practices are considered in this study as are likely to be the result of adoption of new technology - Computer Technology, Communication Technology, & Optical /Video (CD-ROM) technology that enable the acquisition, representation, storage, transmission, and use of information in S&T libraries.

4.3. The Basic Frame of the Study:

The first objective of the study i.e. Status of use Information Technology (IT) was met by using two methods of research: a). Historical Method b) Survey Method The following sources of information were used:

- i) Literature related to the Information systems and its application in academic libraries,
- ii) Reports and documents related to the organizations under study.
- iii) Inquiry from the concerned library managers.

The Tools employed were :

- i) Literature Survey
- ii) Study of documents and other records
- iii) Survey of the individual Organizations

On the basis of Literature Survey a criteria of evaluation for the Organizational Resource study was designed. The data was collected through two instruments: i) Organizational Questionnaire, and b) Data collection sheet. The data was analyzed by using descriptive statistics. The second objective of the study was concerning with the Organizational culture of the Library managers about the use of Computer-based system in S&T libraries. These factors were conceived: i) as associated with the actor (respondents), and ii) influenced by specific situation in which they were observed. Since the solution of the problem were in the present, therefore, the survey method of research was used to study and to minimize the bias.

Four Hypothesis were derived using the literature review and various models of related past study. The following methods were followed to conduct the Survey method of research:.

- a) Identification and specification of problems
- b) Conceptual frame and formulation of Hypothesis
- c) Design of instrument
- d) Collection of data
- e) Analysis of data

- f) Interpretation of data
- g) Testing the formulated Hypothesis
- h) Presentation of reports

4.4 Derivation of Null Hypothesis:

In the light of the objective of the study following hypothesis were derived:

Null Hypothesis 1:

There is no significant difference between those library managers who are involved in computerization and those who are not involved as regard their perception of IT use in S&T libraries.

Null Hypothesis 2:

There is no significant difference between library managers who are encouraged by various professional bodies and those who are not encouraged as regard their perception of IT use in S&T libraries.

Null Hypothesis 3:

There is no significant difference between male and female library managers as regard their perception of IT use in S&T libraries.

Null Hypothesis 4:

There is no significant difference between those library managers who have knowledge of computers and those who do not have as regard their perception of IT use in S&T libraries.

The conceptual framework discussed earlier has been used for designing the questionnaire. (Appendix B). The structured questions were designed so as to assist in computer-based statistical processing of collected research data. The protested questionnaire which has been used for data collection included the following aspects:

- a) Top Management's Interest in IT use
- b) Planning of IT
- c) Perception towards Technology use in libraries
- d) Manpower Planning and Training
- e) Library managers interest & awareness for IT application in library.

The first objective of the study i.e. Status of IT was met by using two methods of research: a). Historical Method b) Survey Method The following sources of information were used:

- i) Literature related to the IT & its application in academic libraries,
- ii) Reports and documents related to the organizations under study.
- iii) Inquiry from the concerned library managers.

4.5. Model Criteria

The model provides a uniform framework for S&T library managers to assist them in the development and implementation of Computer based Information System. Wassermann (1980) stated that a method for information system development should be based upon a small number of underlying concepts.

- Modularisation - The problem solving notion of "divided and conquer" permit one to subdivided a difficult problem in to sub problem and then to subdivide those problems repeatedly until the resulting problems become intellectually manageable.
- Abstraction: The psychological notion of the abstraction permits one to concentrates on a problem at some level of generalization with out regard to irrelevant low level details.
- Written and Oral Communication: Communication of knowledge and concepts among all of the persons involved in the designed and development of an information system is

critical; this information must be represented in such a way that it can be effectively communicated.

- Commitment of development organization to software engineering - the environment in which the development organization works has a strong impact on the ease of communication, the quality of the final product that can be developed, and the productivity of the developers.
- Availability of appropriate tools - tools are major component of an environment and must be usable and well integrated with one another.
- Phases approach to software quality - the quality of the product is determined from the start. Failure to identify the problem or the user needs will result in a poor specification, which will be reflected in an inadequate system , requiring extensive modifications and enhancements that lead to uncontrollable maintenance costs and user dissatisfaction. This reason, above all, provides the best justification for use of a systematic methodology for information systems design.

4.6 Conceptual Frame work:

To understand the extent of use of IT in S&T libraries there is a need to review of the available theoretical framework. There are a number of conceptual frame work which are commonly adopted for studies of area of IT application, extent of their use, growth and development etc. The Nolan's six stage model is adopted for this purpose. The suitability of the model is explored in 4.6.1 as below:

4.6.1. Nolan's Stage Hypothesis:

Richard L. Nolan, a professor at the Harvard Business School, suggested a "Stage Hypothesis" in 1974. This model explained the growth of Computer based System function in any organization on a four stage continuum. In 1979. Nolan revised the model a six stage growth hypothesis.

Nolan's Four Stage Model:

In 1974, Richard L.Nolan² suggested a model, popularly known as "Stage Growth Model". meant for understanding the different stages of EDP growth. As depicted in the model, an organization goes through identifiable stages as it computerizes. This model goes through identifiable stages as it computerizes. This model, finds its application everywhere in computerized processing. This model could prove to be useful to organisations thinking of buying a computer as well as to those who have been using computers for years, decades or so. To help EDP manager communicate with the management and to develop an understanding of computerization among the organizational cadres, this model provides a theoretical framework. As discussed in this model, there are four different stages in the growth of all computerization facilities, each with distinctive applications, regards and managerial problems. When plotted, these stages could be drawn in the form of an S-curve. Nolan described three components of EDP growth process:

- A growth in computer application.
- A growth in the specialization of EDP personnel
- A growth in management techniques and organization.

The four stages of IT-based System growth are discussed by Nolan as follows:

Stage I. Initiation: It could be seen from Fig.4.1, that the moment the first computer is installed in an organization in an organization, the organization is more concerned about the cost saving applications. Issues like long term impact of computer on personnel organization or its strategy, are normally ignored. The emphasis is laid on recruiting personnel with specialization for efficiency of computer applications. Ample amount of freedom is granted to the EDP department with loose budget the lack of controls. The system is installed under the department where it is first used, and usually in the accounting department. The interjection of high-technology into an organization also results in an anxiety generated from fear of job displacement and organizational threats. The management is needed to plug this issue with properly dissected communications.

Stage II. Expansion: With the excess capacities procured at the time of initiation and a general impatience for advanced applications, the EDP function "takes off". There is a steep rise in the EDP budget for hardware, software and personnel. This is also termed as a

period of "contagious, unplanned growth". The applications of EDP proliferate into almost all areas of business activity. Personnel employed are people with specialization to develop variety of applications. The hierarchical position of the EDP manager is hiked up in the organization and the personnel spreads all over the organization. The management is still not exercising full control and the application development does not follow much standards.

Top management is usually attracted to the usefulness of computerization ignoring all its side-effects. This stage often ends up in crisis when top management becomes aware of the explosive growth of the EDP activity and its budgets. At this point, the top management realizes the necessity to undertake resource allocation and coordinate any further growth in the area.

Peculiar during this stage are exponential budget growth rate, cost overruns, exploding demands of the users, euphoric urge of the EDP personnel to excel and evolution of an informal structure among computer personnel. The relationship between computer personnel and users also takes an informal shape. Development of middle level managers in this stage becomes very crucial since a balance between organizational needs and professional interest is hard to achieve.

Stage III. Normalization: During this stage, formalization of reporting systems takes place with the top management becoming more and more concerned about the cost, resource control and centralized effort. The establishment of a charge our system as well as the elaborate and cumbersome quality control measures are peculiar to this stage. The management emphasizes higher priority to control rather than the new application development. The personnel specialize in control and quality assurance in addition to their earlier acquired skills, Settings of steering in addition to their earlier acquired skills. Setting of steering committees, and centralization of efforts and a tendency towards systems programming gets a higher priority. These are backed by strong budgetary (pg.50) planning for hardware and new application. Controls are exercised to contain a run-away budget. Priorities are set up formally to justify budgets and documentation is standardized, Project control and quality control guidelines are also established.

During this stage a separate "System development division" is usually created and the top management direction is necessitated in the resource allocation. Also, this is the time

when the system analysis function should be reorganized to have systems analysts spread throughout the organization to ensure that the user needs are met adequately.

Stage IV. Maturity: After crossing stage-3, the IT based system resource is mature enough to generate continuing economic benefits to the organization. The function starts developing data base oriented application, mainly to supply the top management with division support systems. Also, on-line real time systems with on-line inquiry facility form a part of the development package. The specialization of personnel shifts to data base technology and data communication technology. At this stage, the organization starts preparing 3-5 year corporate EDP plans for further growth. EDP is considered a separate functional area with its own pre-assesses budget. Management control system s are refined and data base policies are introduced.

The System manager is heavily involved in planning for future and enjoys a very respectable position in the organizational hierarchy. The communication at this stage between system manager and top managements as well as between system department and users becomes very crucial. To the avoid conflict, the steering committee may play an important role in the determining project priorities, policies and changes within the system department.

Nolan's Six Stage Model: In 1979, Nolan revised his conceptual model by adding two more stages to his four stage theory. It was in the wake of the sea change which took place in the mission and function of corporate computing activities. This scheme, as mentioned by him supersedes the earlier model for growth of corporate System function. The stages proposed by Nolan in his revised Model are:

- Initiation
- Contagion
- Control
- Integration
- Data Administration
- Maturity

In this model he has emphasized on management of data resource after stage-3 and management of compute resource up to stage-3 and management of computer resource up to stage-3. This calls for restructuring of data processing organization as well as installing new management techniques. The transition point in fig. For Growth Process , as given below indicates the shift of emphasis from computer resource management to data resource management.

Growth Process:

Application Portfolio	Functional Cost & reduction application	Proliferations	Upgrade documentation & restructuring of existing applications	Retrofitting existing applications using IT.	Organizational integration of applications	Application integrations mirroring Information flows
Organization	Specialization of technological learning	User oriented programmes	Middle Management	Established computer utility and user account teams	Data Administration	Data resource management
Data processing Planning & control	Lax	More Lax	Formalized planning & control	tailored planning & Control System	Shared data & common systems	Data resource Strategic planning
User Awareness	Hands Off	Superficially enthusiastic	Arbitrary accountability	Accountability learning	Effectively accountability	Acceptance of joint user & data processing responsibility
Level of Data Processing expenditures						
	Stage I Initiations	Stage II Contagion	Stage III Control	Stage IV Integration	Stage V Data Administration	Stage VI Maturity

As it could be seen from Fig. Above, Nolan has suggested numerous growth processes, which are indicative of stage growth of a system. Important among these are application portfolio; data processing organization; data processing planning and control; and level of user awareness. Nolan also discusses about the application which may not be feasible or economical to automate at every level of management as well as at every stage of growth.

The data base and data communication technologies are introduced into the organization at the close of stage-3. In addition, the computer organization reaches a point where high quality services are reliably provided to the users. In stage-4 the users are provided on-line interactive terminals, pushing the system budget at the same rate as in stage-2.

Nolan has considered identification of the EDP growth stage important from planning and controlling point of view and has given benchmarks of six stages for identifying the growth stage of system in any organization.

In the first level bench marks, the growth stage is considered to be a function of growth rate of system expenditure and its comparison with growth rate of sales as well as of technology being used. In the second level of benchmarks, the growth stages are identified on the basis of growth processes. There are possibilities of any organization having different applications in different stage or any organizations being in the same stage of growth.

Nolan has given the following guidelines to manage system growth successfully:

- Recognize the fundamental organizational transition from computer management to data resource management.
- Recognize the importance of the enabling technologies.
- Identify the stages of the computers operating units to help keep data processing activities on track.
- Develop a multi-level strategy and plan.
- Make the steering committee work.

Janice C. Burn has applied this model successfully in 125 organizations of Hongkong.

- a) The organizations are found to be distributed over full range of Nolan's Stage Growth Model.
- b) There is a noticeable variation between various sectors with regard to stage growth. Government sector was found to be most sophisticated user with only 14 per cent of the users in the earlier stages of growth and more than 60 percent of them in stage-4.

- c) There was a strong correlation between performance return and percentage of investment in information processing activity. She concludes that in some organizations the 6th stage has already reached and in other organizations, it may never reach.

As observed by Dickson, most of the U.S. organizations crossed the control stage by mid-1970's. Many firms, have integrated applications and have become oriented towards data base technology, however, some of them are still towards the tail of control stage.

Suitability of the Model: This model can be used both for diagnosing the current stage of growth of EDP activities as well as for planning changes to control the future direction of Computerized Systems activities. This model has been accepted by many practitioners as a high value tool, and is treated as one of the classics in the field.⁴ The consulting firm of Nolan & Norton Inc. have carried out more than 200 studies based on this model. Nolan's stage hypothesis could be put on a number of used as a conceptual framework. It can be used for finding out the stage for growth which the organization is experiencing.

However, some of the researchers have also found the stage growth model not being supported by the actual data collected from the organizations. As observed by them, the research evidence does not support the contingency relationship between stages and features associated with the growth processes at each stage. But Gordon Davis passes this inadequacy on to the lack of proper research design, non-availability or insufficiency of data. King and Kremr described the Nolan model as an evolutionist which can describe the logic, direction and estimation of the change.

In this study the Nolan stage Growth model is taken as conceptual model to understand the status of use of IT application in S&T libraries.

4.7. CRITERIA FOR EVALUTION:

As mentioned in chapter 1 the S&T library is having all the characteristics of a Model Organization where IT use was found most successful. Their managers are also perform the managerial functions, head their library, have some authority, are responsible to get the work done from the staff, and watch the interest of the staff working in that organization. The

Primary task of the management is to take decision in the direction of achieving set goals and coordinating the efforts put in by various category of staff. The library is also having all the five classical functions of managers suggested by Henary Fayol's for a model business organization. The are:

1. Planning what is to be done
2. Organizing the appropriate structure to accomplish the plan
3. Staffing the organization with appropriate personal and coordinating their activities.
4. Directing the staff towards the accomplishment of the plans.
5. Controlling the activities so that the objective can be made.

Following Criteria is developed for the evaluation of system functions in a library. This is based on the Management functions used in Computer-based system in IIT Delhi Library Systems.

System: A university Library system as a whole

Sub-systems: i) Users services ii) Administrative Services, iii) Systems Services

Following are the main administrative services in an academic / University Institution Library:

- Serial,
- Acquisition
- Circulation
- Technical Processing
- Main Services
- Account Maintenance

Each Administrative Services Module is having a) Operational Procedures, b) Management Procedures.

Following are the activities common to all the Procedures:

i) Initiate. ii) Authorize. iii) Activate. iv) Record. v) Cancel.

4.8. Matrix for Library Activities

In an academic library a set of records and reports had been in vogue since its inception. For example: for maintenance of records, various registers are prescribed and for flow of information from grassroots levels to the top, different reporting performance are in practice. In addition, some more information to monitor the library program activities are also needed in different forms and returns. It should be possible to reduce the overall number of forms, and the number of times an element of information must be transcribed from one form to another, by considering the information requirement of the whole system and consciously designing forms to exploit the time sequence of library processing and the possible interconnection of one activity with another. Much of the information required for one operation is also required in other operations, and MIS is the other name of Records, Reports, and Returns. It takes in to account the systems approach both in the collection and the use of data.

4.9. Elements of S&T Library Information system :

Environmental information

academic plan

profile of library

higher education trends

IT developments

publishing trends

political factors

Library and Information Systems Plan

function and objectives

services

activities

priorities

criteria for evaluation

Financial Information

inflation factors

staff costs/distribution

budget control

buildings

equipment

Performance Indicator

external comparisons

units costs

service delivery times

space utilization

stock turnover

cataloguing throughout/backlogs

speed of supply

Statistics

number of items purchased

number of enquiries handled

number of online searches

use of library

opening hours

User satisfaction

consumer group information

complaints

staff-student committees

questionnaires

surveys of use

knowledge of services

perception

market research

Staff morale

Sickness rates

recruitment success

training time

4.10. System Design:

The Information is the data that has been processed and is meaningful to a user. This follows that some data has to be collected from internal and external sources, stored, processed, retrieved and transmitted to its various users through some systems.

As shown in Figure 4.1 the System is a set of components that operate together to achieve a common purpose. The main components of this system are:

- a) The People such as users - i) different levels of managers who need different type of information for their decision making; and ii) Date processing management which includes Database administrator and all the technical personnel such as programmer, system designers etc. who help in maintaining system and providing needed information.
- b) The Procedures - includes the standards and necessary manuals used to access or request new reports, common communication format, procedures, instructions, rules, regulations etc. which facilitate the use of the system; and
- c) The Equipment's - includes Hardware components, Peripherals, Software components, Database, Data dictionary, networking and system model. These components work together to select, classify, store, analyze, retrieve, and process data to reduce uncertainty in decision making by yielding information to managers at the time they can most effectively use it.

4.11. Components of IT - based Information System in S&T Libraries:

As shown in the Figure 4.3 the basic components of a Computer-based MIS are given below:

1. The users: The users of the are all the different levels of decision makers of the academic libraries.
2. Inputs: Inputs provides the basic raw data to for information systems to operate. All data which has some bearing on its functioning should be recorded. The input data used to produce information originate from internal and external sources. Internal sources consist of individuals and department, units, located within the organization. The sources furnishes facts on regular and planed basis. External information is generated from the data outside the organization.
3. Outputs: The basic purpose of any Information system is to generate information which are found useful by its users in discharge of their responsibility: The outputs can be

either prescribed in terms of its contents, structure and frequency. To provide the quality information the systems found relevant to the library environment includes:

4. Communicational Channels: The output may received through the single PC or more than one PC or Terminals connected through Network.
5. Procedures: Include all the user manuals designed to facilitate the utilization and user manuals designed facilitate the utilization and interaction of the user with the system the standard, data security measurements. The purpose of the procedures is to maintain standards, data security, and provide the user with the necessary on-line construction to facilitate environment. That is, this environment enable the user of the system to work with enough instruction to produce the complexity of the system.
- 6., Data Processing Management: Normally, data processing management includes all the technical and operation personnel to support the development of a in a data base environment. One of the first responsibilities of top management is to establish the data base administrator. The data base administrator can be one person or more. The main data base administrator function is to be responsible for the standardization and coordination of the institutional data resources. Basically this group is in charge of management and control of the data resources of the institution.
7. File or/ Data base: Files or database are used for storing data about entities or things of interest to the users of information. The database should be regularly updated to reflect the changes of in the status of the concerned entity. In a computer-based systems the important components are the Hard ware, Software and Peripherals.
8. Data dictionary (DD):
This represents the depository of information about the institutional data elements. The DD represents an invaluable tool for the data base administrator as it permits control and management of the data resources by the use of a common, centralized and standardized depository of information concerning the institutional data. This DD can be a manual one. However the current development in DD technology indicate that more and powerful software packages are becoming available to assist the development of automated DD development of efforts (Ross, 1981).
9. Decision models software: Basically, the institutional data base development effort must be able to produce the institutional information requirements for general administrative computing and management requirements. However, the university library must require the

utilization of very specialized management decisions models and the must integrate decision models software as part of the basic components.

4.12. IT -based Information System (IS) Development Life Cycle:

There are very few comprehensive methodologies or frame works specially designed for developing IT-based IS in academic libraries. Atwood (1977) suggested the following steps

1. Systems analysis
2. Feasibility study
3. System design
4. Equipment selection
5. Programming
6. Conversion
7. Documentation
8. Implementation of the design.

Some of the early methodologies were intend for the systems professionals (Bingham & Davis, 1972; Hussain, 1975; Kindered, 1973).

The methodology used for developing and implementing computer-based systems affects its acceptance and use by the users. Experience and research has sown that greater the participation and involvement of end users in the computer-based systems development and implementation process, greater is the likely hood of its being accepted and used by the users.

The popular computer-based systems development methodologies in use are: a) the traditional methodology for computer-based systems development which is more popular in use is known as the System Development Life Cycle (SDLC). The more modern approach which is also gradually increasing in use is known as Prototype Methodology.

In System Development Life Cycle (SDLC) methodology the following main steps are generally adopted.

1. Definition stage: Initiation and proposal definition; Feasibility assessment; conceptual and logical design.
2. Development stage: Physical systems design; physical file/database design; processing logic/program development; testing; procedure development and documentation..
3. Installation and operation stage: Changeover/conversion; operation; maintenance; post audit and evaluation.

Prototyping Approach to development of Information systems (IS) is an evolutionary design method particularly suitable in situations where requirement are difficult to specify in advance or when requirements are changed significantly during development period itself. It is based on the proposition that users can express their information needs, what they require or don't require more easily and correctly about an existing information system. In this approach:

- a) the systems designer identifies user's initial, basic requirements.
- b) a prototype system is used which may not have all the desired requirements or feature in all respects.
- c) user uses the prototype in actual practice and gives feed back to the systems designer about the inadequacy about the prototype system.
- d) the system designer revises the prototype system according to the requirements of the users. The feedback / enhancement cycle is repeated until a satisfactory system has been developed.

Although use of prototype methodology results in more useful system, it is not easy to implement as it requires users/ administrators and system designers to work together closely and continuously during the development of the systems.

CHAPTER - 5

RESEARCH DESIGN

In this chapter the procedure used for testing the hypothesis developed in the previous chapter are outlined here. The nature of study, assumptions, variables studied, basic frame of study, research design, sampling, construction of scale, Collection and analysis of data are also briefly discussed

5.1. Nature of the study:

The study is of exploratory nature. It deals with the study of: i). Dynamics of management in academic libraries, ii). Extent of use of Computer-based MIS in the given three academic libraries, and iii) Evaluation of the factors which act as its facilitator and the inhibitors. The approach to the present study includes:

- Exploratory Interviews with the knowledgeable and experienced persons/experts
- Exploratory Research using review of literature
- Factual Data Collection regarding computerization of MIS in selected Academic libraries, and
- Primary Perceptual Data Collection from the library Managers

5.2. The Basic Frame of the Study:

Four Hypothesis were derived using the literature review and various models of related past study. The following methods were followed to conduct the Survey method of research::

- a) identification and specification of problems
- b) conceptual frame and formulation of Hypothesis
- c) Design of instrument
- d) Collection of data
- e) analysis of data
- f) interpretation of data

- g) testing the formulated Hypothesis
- h) presentation of reports

The Tools employed were:

- a) Questionnaire
- b) Checklists
- c) Rating Scale
- d) Observation
- e) Interview
- f) Visits

5.3. Research Design:

The following two instruments were developed to collect the research data:

- i) Study of Library Organizational Resources.
- ii) Study of Library Organizational culture.

Library Organizational Study(Resources): The study of library organization(Resources) has been aimed at collection factual data regarding IT use in the S&T libraries under study. The conceptual framework discussed earlier has been used for designing the questionnaire. (Appendix A). Various aspects covered in the questionnaire are listed below:

- a) the computer-based Information systems components available
- b) the source of computing power
 - i) owned by library system
 - ii) available through computer center
- c)
 - i) in-house development
 - ii) other library systems; and
 - iii) commercial vendors
- d) the planning approaches to library computerization adopted
- e) the data processing methods used
- f) Status of Information Systems functions
- g) Budgetary allocation
- h) Technology
 - i) software environment

- ii) Hardware
- iii) Networking/communication
- i) Personnel in IT -based Information systems

To test the effectiveness and efficiency of the developed questionnaire, it was pre-tested. The data generation capacity was examined and the questionnaire was used for data collection.

Library Organizational Study (Values, Culture, perceptions and attitudes): The study of organizational culture was designed to collect the data related to the culture of the library, attitude, value, perception from the executives of the libraries under study. This study was aimed at measuring different attitude & perceptions of the library managers and the computer professionals.

5.4 Sampling techniques:

Stratified convenience sampling was used to select the respondents from the given 77 libraries in the following groups. The total respondents in the study were 163.

The Criteria for selection of the respondent were: involvement in library automation, responsibilities, pay scale etc. Using this criteria 163 respondents of these libraries were identified. This includes all the Library managers and Library Automation staff above the pay scale of Rs. 6500 -10500. The respondents of study were categorized on the basis of:

- a. Age
- b. Designation
- c. Sex
- d. Status
- f. Qualifications
- g. Professional Experience, etc.

5.5 Construction of Scale:

The subjects of the study being human being and the area of the study being Perceptions of the managers towards IT application in S&T libraries, it was decided to use the Likert's scaling techniques for measuring the perception of Library managers towards IT application / use in libraries. This was constructed according to the steps described by the Likert, Rensis (1932). Henerson, Marlene E and others (1991). The Scale was suitably

modified according to the reset of the test and the positive and the negative statements were identified. The positive and the negative statements from the scale are:

Positive Statements: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21

Negative Statements: 11

5.6 Reliability and Validity:

Most of the items in the scale are taken from the questionnaires developed by Dumont, P and Dumont, R (1980). As those questionnaires were reliable and valid, it was presumed that scale was having the same validity.

5.7. Procedures:

To gather the necessary data for answering the research questions put forward by this study, two questionnaires were designed and their reliability was tested in a pilot study conducted at Jamia Millia Library in the month of November 2000. The purpose of this pilot study was to test the validity of the questionnaires both as a data collection instruments and a statistical measuring device.

The questionnaires were distributed personally. The purpose of questionnaire on library organization was to gather data on the IT use in S&T libraries, and the policies supporting the introduction and use of IT use / adoption in S&T libraries. The second questionnaire gather data about Library managers perception about IT -based System in libraries under study. It was planned initially to interview all of these respondents, but after conducting the interview with ten respondent became appear that more interviews would not add further information to what had been gathered. It was decided, therefore, not to proceed further in this respect. Since all the libraries including Jamia Millia Library library selected for Pilot study were located in Delhi, the respondents were personally approached in their respective libraries. This helped to build a personal support with the respondents and helped in collection of accurate and correct data. This also helped to achieve the high response rate. The survey was conducted during the periods of November 2000 to February 2001.

Generally, the respondents were quite cooperative, but it was not possible to collect the questionnaire in one visits to the libraries because of their heavy workload and engagements. Due to the persistent efforts and several visits to the libraries 163 questionnaires on library managers perceptions were returned out of the 180 distributed,

resulting in a response rate (90. 55%) was quite encouraging for statistical analysis. 77 questionnaires were distributed personally to collect data on library organizational data , including SWOT analysis. All the questionnaires were returned duly filled to with comments with 100% response rate.

The processing of data included the validation of the questionnaires and codification, tabulation, entry, and analysis of data. Data gathered from the two different questionnaires were codified and entered in to the computer and tabulated using SPSS (Statistical Package for Social Science). From the analysis of these statistical outputs, the general trends have been depicted and statistically significance observation, if any, have been made on the basis of the discussion the author had with the executives and any subsequent data collected from the library organizations. Data pertaining to all the questions has been addressed to the discussion. The data collected with the help of the perceptual questionnaire from 108 executives has been analyzed. The obtained responses have been categorized in to various parameters. Scoring pattern of the statements are given as below:

Table:5.1

Agreed/ disagreed	Score for Positive Statement	Score for Negative statements
Strongly agree(SA)	5	1
Agree (A)	4	2
Undecided (U)	3	3
Disagree (D)	2	4
Strongly disagree	1	5

The Non - Parametric test of significance (chi-squire test) was used for hypothesis testing. The test results were set to an error level of 0.05, which means 5% error in the results of the study is admissible for interpretation of data.

CHAPTER - 6

ORGANIZATIONAL STUDY

(ANALYSIS OF DATA)

This chapter reports the descriptive statistical analysis of the organizational data collected from the published reports as well as from the responses received from the Heads / Librarians representing the central / main libraries of the S&T libraries located in Delhi state. The organizational Data Matrix of each academic library is also given.

6.1 OVERVIEW:

This chapter reports the descriptive statistical & SWOT analysis performed on the data collected through the three instruments : a) Perceptual questionnaire, IT and Internet use, and b) Data Collection sheet. The instruments were designed for the collection of data on the aspects related to the Organizational resources i.e Strength, weakness, opportunities and threats (SWOT Analysis) of the given libraries. The Directory of R& D Institutions (1999) published by DST and University Handbook (2001) published by AIU, Delhi were made the basis of Selection of Sample. The Stratified convenience sampling was used to select the respondents from the given 72 libraries/ Documentation Centers . The total respondents in the study were 163 which were taken from these 72 Libraries considering their responsibility. In affiliated institutions, the library staff working in the basic pay of Rs. 5500 are also taken as respondents. These 72 libraries / Documentation Centers were devided in to 15 different groups. Groups wise libraries undertaken in the study is given as below from Group -I to Group - XV.

Group. I. Libraries of International S&T organizations of Delhi State.

S.No.	Name of the S&T Organization	Abbreviation
1	World Health Organization, New Delhi	WHO
2	UNESCO, S&T Documentation Center, Vasant Vihar, Delhi	UNESCO

Group -II. National level Library & Documentation Centers:

S.N.	Name of the S&T organization	Abrbreviation
1	Indian National Scientific Documentation Centre, New Delhi	INSDOC
2	Defence Scientific Information & Documentation Centre, Delhi	DESIDOC

Group -III. Academic Institutions of National importance:

S.N.	Name of the S&T organization	Abrbreviation
1	Indian Institute of Technology (IIT), Delhi.	IITD
2	All India Institute of Medical Sciences (AIIMS), New Delhi.	AIIMS

Group -IV. Demed University level Institutions in the field of S&T

S.N.	Name of the S&T organization	Abrbreviation
1	School of Planning and Architecture, New Delhi	SPA
2	Teri School of Advanced Studies, New Delhi	TERI

Group -V : Libraries of Science & Technology Departments/Centers.

S.N.	Name of the S&T organization	Abrbreviation
1	Delhi University, Delhi	DU
2	Jawahar Lal Nehry University, Delhi	JNU

Group -VI. Demed University level Institutions in the field of Agriculture and Pharmacy:

S.N.	Name of the S&T organization	Abrbreviation
1	Indian Agriculture Research Institute (IARI), Delhi.	IARI
2	Jamia Hamdard, New Delhi	Hamdard

Group VII. GGS Indraprastha University & its affiliated Privately Managed S&T Academic Institutions in Delhi State .

S.N.	Name of the S&T organization	Abbreviation
1	GGS Indraprastha University, Delhi	IP
2	Amity School of Engineering & Technology, Delhi	ASE&T
3	Banarsidas Chandiwala Institute of Hotel Management & Catering Technology	BCIH
4	Banarsidas Chandiwala Institute of Information Technology	BCII
5	Bharti Vidyapeeth's College of Engineering	BVCE
6	COMMIT - IT Career Academy	COMMIT
7	Delhi Institute of Advance Study	DIAS
8	Delhi School of Professional studies & Training	DSPS
9	Electronic Research and Development Centre	ERDC
10	Gittaratan Institute of Advance Studies & Training	GIAS
11	Guru Nanak Institute of Management	GNIM
12	Guru Prem Singh Memorial College of Engineering	GPMC
13	Guru Teg Bahadur Institute of Technology	GTBI
14	Ideal Institute of Technology and Management	IITM
15	Institute of Information Technology and Management	ITM
16	Institute of Management Science and Productivity	IM&P
17	Institute of Rehabilitation Sciences Medicine & Allied Sciences	IRM
18	Kalka Institute of Research & Advance studies	KIR&I
19	Madhubala Institute of Communication and Electronic Media	MICE
20	Maharaja Agrasen Institute of Technology	MAIT
21	Maharaja Surajmal Institute	MSI
22	New Delhi Institute of Information Technology	NDIIT
23	R.C. Institute of Technology	RCIT
24	Rukmini Devi Institute of Advance Studies	RDIA
25	Sirifort College of Computer Technology	SCCT
26	T.V.B School of Habitat Studies	TVB
27	Vastu Kala Academy	VASTU

Group -VIII : Libraries of specialized Media & Communication Technology of Central Universities.

S.N.	Name of the S&T organization	Abbreviation

1	Indira Gandhi National Open University, New Delhi	IGNOU
2	Jamia Millia Islamia, New Delhi	JAMIAM

IX. Libraries of some Government Funding Organizations.

S.N.	Name of the S&T organization	Abbreviation
1	Department of Science and Technology, New Delhi	DST
2	University Grant Commission, New Delhi	UGC
3	All India Council of Technical Education, New Delhi	AICTE

Group -X. DRDO Institutions in the field of S&T.

SN	Name of the S&T organization	Abbreviation
1	Center for Environment and Explosive Safety , Delhi	CEES
2	Defence Institute of Fire Research, Prolyn Road, Delhi,	DIFR
3	Defence Institute of Physiology and Allied Science Delhi	DIP&AS
4	Defence Institute of Psychological Research, Prolyn Road, Delhi.	DIPR
5	Defence Science Centre, Metcalfe House, Delhi-54	DSC
6	Defence Scientific Information & Doc. Centre (DESIDOC) Delhi.	DESIDOC
7	Defence Terrain Research Laboratory, Metcalfe House,Delhi-54.	DTRL
8	Institute of Nuclear Medicine & Allied Science, Delhi-.	INM&AS
9	Institute of Systems Studies & Analysis, Delhi.	ISS&A
10	Scientific Analysis Group, Metcalfe House, Delhi-54.	SAG
11	Solid State Physics Laboratory, Lucknow Road,Delhi.54.	SSPL

Group -XI. CSIR Institutions in the field of S&T.

S.N.	Name of the S&T organization	Abrbreviation
1	Council of Scientific & Industrial Research (CSIR), Rafi-Marg, New Delhi.	CSIR
2	Central Road Research Instt. Delhi	CRRI
3	Centre for Biochemical Technology, Delhi	CBT
4	INSDOC, 14, Satsang Vihar Marg, Delhi	INSDOC
5	National Institute of Science Communication, Delhi.	NISC
6	National Institute of Science,Technology & Development Studies, Delhi	NISTAD
7	National Physical Laboratory, Delhi	NPL

Group -XII. ICAR institutions in the field of S&T

S.N.	Name of the S&T organization	Abrbreviation
1	IARI, Pusa Road, New Delhi-12	IARI
2	Indian Agricultural Statistics Research Institute, Delhi	IASRI
3	National Bureau of Plant Genetic Resources, New Delhi-12	NBPGR
4	National Centre for Agri. Economics & Policy Research. Delhi	NCAEPR
5	National Centre for Integrated Pest Management, New Delhi	NCIPM

Group -XIII. ICMR Institutions in the field of S&T

S.N.	Name of the S&T organization	Abbrbreviation
1	Institute for Research in Medical Statistics, Delhi	IRMS
2	Institute of Cytology & Preventive Oncology, Delhi.	ICPO
3	Institute of Pathology Safdarjung Hospital Campus, Delhi	IOP
4	Malaria Research Centre, 22, Sham Nath Marg, Delhi	MRC

Group -XIV. Libraries of other Institutes of S&T.

S.N.	Name of the S&T organization	Abbrbreviation
1	National Medical Library, New Delhi	NML
2	National Institute of Health & Family Welfare, New Delhi	NIHFW

Group -XV. Libraries of Academy, Associations etc.

S.N.	Name of the S&T organization	Abbrbreviation
1	Association of Indian Universities	AIU
2	Indian National Science Academy	INSA

NOTE: DESIDOC & INSDOC, and IARI are given under above given two different tables.

DESIDOC & INSDOC are taken in Group - II National Libraries & Documentation Centers.

IARI is taken under Group - VII. Deemed University. In place of the full name of the Institution, the abbreviations, as given in the **table above**, are used throughout the study.

6.2. Resources Data matrix: Organizational resource data matrix is prepared by giving weight to each of the resources at 5 point weight scale. The matrix of the factor is described as below:

Table: Organizational Resource Data Matrix:

S.No	Variable
1	Librarian's Status: The weight to this variable is given on the basis of Professionally qualified Librarian's pay scale. The Pay scale started with 16,400 = 5 full point, 14,400 = 4 points, 10,000 = 3 points, 8000 = 2 points, and below that but Professional = 1
2	Institute's Central Computing facilities = with WAN = 5, With only LAN = 4, Computing facility with only Modem = LAN = 3, Stand alone PCs PCs = 1.
3	Library Computer Application Division = Division with Library OPAC Server, CD-NET Servers, Web Servers, PCs , Library Subnet = (1+1+1+1+1+1) 5 full points,
4	Access to Electronic Journals: 1-100= 1 points, 101 to 300 = 2 points, 301 to 600 = 3 points , 601 to 1000 = 4 points, Above 1000 = 5 points
5	CD-ROM Data bases = CD-ROM -ERL Technology: LAN access, Budget above 30 Lacs = 5 Points, Budget upto 20 Lacs with 10 users access = 4 points, Budget up to 10 Lacs with 5 users access =3 points, Stand alone = Nil
6	Bar Coding Technology = All Books & Users with Bar code Printer , scanners = 5 points, Software with Circulation application = 5 points, Bar Coding of Books only = 3 points
7	Division wise Library Computerization: (Acquisition = 1) + Processing=1 + (Circulation=1) + (Serial =1) + (Administration & Maintenance =1)= 5
8	Library OPAC: OPAC with Book & Journals = 5 full points , Only Books 4 points
9	Integrated Library Software = 5 full points, others = No points
10	Library collection Computerization : Above one Lacs = 5 points, 50, 001 to 1 Lacs = 4 points, 25,000 to 50,000 = 3 points, Below 15,000= 1 point

6.3. Brief description of the Library systems of the individual libraries:

A brief description of the Library systems of the individual libraries is given in the three main headings: Brief introduction about the Institute, its computing facility available at campus, its Library facilities. The description of the university library systems is based on the information collected through data sheets, Organizational Questionnaires and Managerial

perceptions and SWOT analysis questionnaires. University / Institution's wise description is given as below:

Group. I. Libraries of International S&T organizations in Delhi .

1. World Health Organization (WHO), IP Estate, New Delhi.

A specialized agency of United Nation in the field of science and Technology. WHO's work includes reducing the global burden of disease by tasking action against the main diseases of the world, reducing the risk factors for ill health, increasing the knowledge based on health issues through co-ordinating research , setting standards and guidelines and assisting countries in improving their health systems and making them more equitable. It is having a most modern library and documentation center.

Table. Library Resources Data Matrix

S.No	Variable	Matrix	Cumulative total
1	Librarian's Status	5	5
2	Central Computing facilities	4	9
3	Library Computer Application Division	3	12
4	Access to Electronic Journals	4	16
5	CD-ROM Data bases (ERL Technology):	1	17
6	Bar Coding Technology	4	21
7	Division wise Library Computerization	2	23
8	Library OPAC:	4	27
9	Integrated Library Software	4	31
10	Conversion of Library collection	4	35
	TOTAL		35

Phase of Development at Nolan's Six Stage Growth Model = 35 / 50x6 = 4.20. Completed

Phase -IV

2. UNESCO, S&T Documentation Center, Vasant Vihar, New Delhi -57.

Covers countries of south and central Asia, working in co-operation with national and regional organizations. Special focus on Science and technology for development science for progress and the environment, natural resources management. Having well established modern library and Documentation Center. It has more than 31,000 Unesco reports & special collection in the field of S&T.

Table. Library Resources Data Matrix

S.No	Variable	Matrix	Cumulative total
1	Librarian's Status	3	3
2	Central Computing facilities	2	5
3	Library Computer Application Division	2	7
4	Access to Electronic Journals:	4	11
5	CD-ROM Data bases (ERL Technology):	1	12
6	Bar Coding Technology	4	16
7	Division wise Library Computerization	2	18
8	Library OPAC:	3	21
9	Integrated Library Software	4	25
10	Conversion of Library collection	3	28
	TOTAL		28

Phase of Development at Nolan's Six Stage Growth Model = 28/50x6 = 3.36. Completed

Phase -III.

Group -II. National level Library & Documentation Centers:

1. Indian National Scientific Documentation Centre (INSDOC), Satsang

Vihar Marg, New Delhi-67.

It is a premier organization dealing with library, documentation and information science, technology, Services and systems. It is a national laboratory under the Council of Scientific and Industrial Research (CSIR) providing information and documentation services both at the National and the international levels. The main activities of INSDOC are given as below:

- Products, Services, and Publications
- Projects in Competency Areas
- National Information Resource
- Education and Training
- International Collaboration

Since its inception in 1952, INSDOC has been providing information services that aim at fulfilling the information needs of researchers and scientists in the country. Over the years, INSDOC has designed several information products and services for the corporate and business sectors as well. Keeping pace with the technological developments, new information products are being brought out on CD-ROMs and new services offered. Its main competency areas include: Library automation, Library networks, Computer networking, Electronic libraries, Digital & Virtual libraries, CD-ROM networking, Design and development of databases, Access to international information sources, on-line systems, Feasibility studies, and Design, establishment and operational management of library-cum-information centers.

INSDOC houses the National Science Library which acts as a major information center in the country in the area of science and Technology (S&T). It has one of the finest collections in Information Science and Technology and a strong reference collection in general S&T aspects. It receives about 5,600 periodicals both Indian and foreign. A significant number of these periodicals are received in electronic form in CD-ROM's.

INSDOC has a strong academic and training programme. As part of the academic programme, INSDOC offers a Master's level programme in Information Science called Associate ship in Information Science. INSDOC also conducts regular short-term course and

attachment training programmes on various topics, including the application of computers and information technology in the field of library, documentation and information. To support its academic and training programmes, INSDOC has set up an information technology laboratory which is equipped with the state of the art computer and networking facilities to ensure high quality education and training to the students.

INSDOC works closely with counterpart institutions in other countries to bring about global information exchange. INSDOC is associated with the activities of international Federation for Information and Documentation (FID), International Federation of Library Associations (IFLA), World Health Organization (WHO) and the Documentation Centre of the South Asian Association for Regional Co-operation (SAARC).

Scientific and technical activities of INSDOC are organised under four groups at its Headquarter in New Delhi. Each group comprises two or more divisions or activities. The present organisational structure is as follows:

1. Data, Computer and Software Group (DCSG).
2. Education, Training and Translation Group (ETTG)
3. Library, Bibliographic and Bibliometric Group (LBBG)
4. Programme management and marketing group (PMMG)

A team of about 250 personnel comprising scientific, technical and administrative staff is handling the programmes of INSDOC. Over 100 persons of the staff are graduates or postgraduates in science, engineering or other fields. Many of them have specialisation in Library, Documentation or Information Science.

Wide dissemination of S&T information is an important aim of INSDOC. For this purpose, it has a network of regional centres located at Bangalore, Calcutta and Chennai to provide information services in these regions. In addition to this, INSDOC's services are available through Communication Research Consultants, Calcutta for the Eastern and North-Eastern regions of the country. To establish appropriate linkages with national institutions and to evolve a national resource base in S&T journals, monographs, books, reports, patents, theses, dissertations and other grey literature to enable single point access for S&T information generated in India.

- To plan and run academic programmes as well as to organise short-term course, seminars, workshops and conference to facilitate development of human resources.
- To offer consultancy services to national and international organisations.

- To collaborate with institutions in other countries and international organisations to establish global linkages and to keep up-to-date with world wide developments.
- To develop low-cost information products and services specifically directed towards the need of high volume users such as schools, colleges and small scale industries.
- To evolve, incorporate and promote national standards.
- To participate in and contribute to the national societal missions.

Table. Library Resources Data Matrix

S.No	Variable	Matrix	Cumulative total
1	Librarian's Status	5	5
2	Institute's Central Computing facilities	5	10
3	Library Computer Application Division	5	15
4	Access to Electronic Journals:	5	20
5	CD-ROM Data bases (ERL Technology):	2	22
6	Bar Coding Technology	2	24
7	Division wise Library Computerization	3	27
8	Library OPAC:	4	31
9	Integrated Library Software	4	35
10	Conversion of Library collection	3	38
	TOTAL		38

Phase of Development at Nolan's Six Stage Growth Model = $38/50 \times 6 = 4.56$. In the mid way of Phase -I V

2. Defence Scientific Information and Documentation Centre

(DESIDOC), Metcalfe House, Delhi - 110054

DESIDOC started functioning in 1958 as Scientific Information Bureau (SIB). It was a division of the Defence Science Laboratory (DSL) which is presently called Defence Science Centre. The DRDO library which had its beginning in 1948 became a division of SIB in 1959. In 1967 SIB was reorganised with augmented activities and named Defence Scientific Information and Documentation Centre (DESIDOC). It still continued to function under the administrative control of DSL. DESIDOC became a self-accounting unit and one of the laboratories of DRDO on 29 July 1970. The Centre was functioning in the main building of Metcalfe House, a landmark in Delhi and a national monument. In August 1988 it moved to its newly built five-storeyed building in the same Metcalfe House Complex. Since it became a self-accounting unit, DESIDOC has been functioning as a central information resource for DRDO. It provides S&T information, based on its library and other information resources, to the DRDO headquarters, and its various laboratories at various places in India. Following are some of the main area of work :

- Library Services
- Online Public Access Catalogue
- CD-ROM Search Service
- Document Supply Service
- Resource Sharing
- **Information Processing & Dissemination:** Collection of S&T information of DRDO interest, provide current awareness services to DRDO Scientists. This includes Newspaper Clippings Service, IEE/IEEE contents.ence and Technology.
- **Database Development:** Bibliographic databases development maintained by DESIDOC.

-OPAC, Bibliographic database of books/reports/conference proceedings in Defence

Science Library, SPIE/IEE/IEEE conference proceedings, Journal articles database, Full text databases, Newspaper clippings

-Defence Science Journal

-IEE/IEEE Contents

Table. Library Resources Data Matrix

S.No	Variable	Matrix	Cumulative total
1	Librarian's Status	5	5
2	Institute's Central Computing facilities	5	10
3	Library Computer Application Division	5	15
4	Access to Electronic Journals:	5	20
5	CD-ROM Data bases (ERL Technology):	2	22
6	Bar Coding Technology	4	26
7	Division wise Library Computerization	3	29
8	Library OPAC:	5	34
9	Integrated Library Software	5	39
10	Conversion of Library collection	3	42
	TOTAL		42

Phase of Development at Nolan's Six Stage Growth Model = $42/50 \times 6 = 5.04$. Completed

Phase - V.

Group -III. University level Institutions of National importance

1. All India Institute of Medical Sciences, New Delhi-29 (AIIMS)

Address : Ansari Nagar, New Delhi 110029, Institution of Excellence in the field of Medical Sciences, Institution of National importance. President Union Minister for Health. Established as an autonomous body under an act of parliament in 1956 as an Institution of national importance in the field of medical sciences and allied subjects. President - Union Minister for Health. It also demonstrate the high standard of teaching at Under Graduate & Post Graduate medical education and also participates in the research and development activities. The Institute has developed the centers of research in Ophthalmic sciences; cancer; community medicine; human reproduction; immunology; Cardio, thoracic; and various other medical declines. It also undertakes research projects related to Bio medicines, Bio mechanics, and Bio Technology in association of IIT, Delhi and other with other organizations. It is also having well equipped clinical facility with emergency facility to indoor & outdoor patients.

The main courses of study are M.B.B.S, B.Sc.(Hons) in Human Biology, Paramedical courses, Nursing etc. In post graduate courses of study are : MD; MS; DM; MCH; M.Sc. (Drug Assays); Master of Bio Technology: MDS; MHA & Ph. D. etc.

The strength of available Faculty is 400, supporting staff 2000; UG students 250' PG. 450, & Research scholars are 500.

Institute Home Page Address [http://www.aiims.ac.in"](http://www.aiims.ac.in)

Central Computing facility with Networking and Internet facility is available.

Library: B.D. Dixit Library, **Working Hours:** 9.00 A.M. to 2.00 A.M, **Collection:** Books 62000, **Periodicals:** No. of Current journal's titles 450 , Bound volumes 50,000, Electronic Journals: 50. **CD-ROM Data bases:** 300, **Video Library:** Video cassettes 350, VCPs 4.

Library Computer Resources: Library's sub-LAN, with 20 Terminals, Libsys Library Software latest version, Books & Journals are also available on Library OPAC. Use of Bar Coding technology in Circulation controls. Bar code printer is also available.

The Librarian of the Institute is in Professor Scale. In addition to this there is one Assistant Librarian, and three Section heads in Sr. Professional Assistants grade.

Table : AIIMS Library Resources Data Matrix

S.No	Variable	Matrix	Cumulative total
1	Librarian's Status	5	5
2	University Central Computing facilities	5	10
3	Library Computer Application Division	4	14
4	Access to Electronic Journals:	2	16
5	CD-ROM Data bases (ERL Technology):	4	20
6	Bar Coding Technology	4	24
7	Division wise Library Computerization	3	27
8	Library OPAC:	3	30
9	Integrated Library Software	5	35
10	Conversion of Library collection	3	38
	TOTAL		38

Phase of Development at Nolan's Six Stage Growth Model = $38/50 \times 6 = 4.56$. Advanced stage of Phase -I V

2. Indian Institute of Technology, Delhi-16 (IIT. D)

Address : Hauz Khas, New Delhi -16, Visitor : President of India.

Established in 1961 as a college of Engineering and Technology. By an act of Parliament in September 1963, it was declared to be an autonomous body under an act of parliament in 1961 to be an Institute of National importance and renamed as Indian Institute of Technology, Delhi. It is one of the six Institutes of Technology in India created as centre of excellence for higher training, research, and development in science engineering and technology. It is a residential Institute with a campus of 320 acres. It provides residential facilities to the 500 Academic staff, 700 non academic staff. There are 9 hostels which may accommodate more than 3000 students. In addition to this the campus provides hospital facilities, lecture rooms for teaching, conference and meeting facilities, Library facilities, Central computing facilities, workshops, etc. It has 13 Departments & 9 Centers.

It provides teaching and research facility in more than 22 major areas of science and technology. It provides courses of study leading to B.Tech, M.Tech, M.S., M.Sc.M.Des, M.B.A., 5 Years dual degree programmes leading to M.Tech degree, and research

Computing Facility : The IIT, Delhi computing facility contains more than 1550-switched ports. These switched ports are grouped into 35 Virtual LANs covering each Center, Department, Central Facility and Administration. Three routes have been configured in a hot-standby mode to interconnect all Virtual LANs, to create one DMZ network for Virtual Servers, and to create one isolated LAN for administrative Computer Support Services (ACSS). Twenty-one Cisco Switches (Catalyst 5000/5500) are interconnected in a tree topology. Dual Fast Ethernet connection Provide 200 Mbps full duplex communication links among switches. The old Institute Bridged LAN (pre-1998) is also connected to the new network through one switched port.

The Firewall provides three major functions: 1. Protection of the Campus LAN from unauthorized users access from the Internet , 2. Network Address Translation (nat) from private IP Network numbers (10.0.00/8) to legalIP numbers (202.141.68.0/22&202.54.26.80/28), and 3. Controilloed Access to IIT Delhi World Wide Web, Mail, & DNS Serves which exist as Virtual Resources on the DMZ LAN. The overall physical arrangement of the Campus LAN/WAN is shown in the figure given below.

The Campus LAN is a state-of-the-art switched and routed network with Fiber Optic Backbone and Enhanced CAT5 UTP cabling. The Campus LAN is connected to the Internet through a 2 Mbph VSNL Radio-Link, an external Cisco Router, aDMZ network, and a Cisco PIX Firewall. Connection of Campus backbone to Internet hub:

- Router
- Ethernet interfaces
- High speed synchronous and asynchronous serial ports
- Routing support for IP and IPX protocols

Internal Network Security:

- Single point of entry for the Internet. All the data between the campus network and the Internet must pass through a fire wall . (Fire wall - A Checkpoint software)
- Additional securities and Accounting in order to track the source and destination addresses of all traffic.(e-mail, WWW, ftp, telnet, gopher, and so forth).
- Restriction to certain unwanted traffic while allowing certain predefined services.

Central Library: IIT, Delhi Library System supports the teaching, research and development programs of the Institute through one Central and 17 Departmental Libraries.

The Central Library is the main constituent part of the Library System which is one of the most modern academic library. It is a three storied, centrally air-conditioned building. All the students, faculty, employees of the Institute are entitled to make use of its services and

facilities. The members of the Institute's Alumni Associations are also entitled to library facilities including borrowing books. Retired teaching and non-teaching staff members can also avail borrowing facility on the financial guarantee from one of the faculty members of the Institute. Library also extends its facilities to the industries under its corporate membership programme. It has more than 6500 registered users.

Working Hours: The library remains open throughout the year except six days, namely Republic Day, Independence Day, Dussehra, Diwali, Holi, Mahatma Gandhi's Birthday and any other holiday declared as a special holiday. It remains opened from 9.00 a.m. to 9.00 p.m on working days and 10.00 a.m. To 6.30 p.m. on Saturdays, Sundays and holidays. Library also remains opened up to 12 mid night during Minors & Majors examinations to provide consultation and textbook facilities to the students.

Resources: The collection of Central Library has increased to three lakhs comprising books, Periodicals, Standard Specifications. Technical Reports, Thesis, CD-ROM databases, Bound Volumes of Journals, & Video cassettes.

Video Library: Library is also having Video library equipped with four VCPs and Video Display Units. It has a collection of more than one thousand video cassettes.

Journals: It receives more than 800 current journal (print form) on various disciplines. There are more than 80,000 bound volumes of journals available in central library. In addition to this about 1400 electronics journals can also be accessed full-text through the sites of the following main e-publishers:

ScienceDirect (Elsevier Science) (<http://www.sciencedirect.com/>)

IEEE/IEE Electronic Library: IEEE xPLORE (<http://www.ieee.org/ieeexplore/>)

American Physical Society (APS) (<http://www.aps.org/>)

American Institute of Physics 9AIP) (<http://oipss.aip.org/>)

ACM Digital Conference Library (<http://www.acm.org/dl/>)

American Society of Civil Engineers (<http://www.pubs.asce.org/journals/jrns.html>)

Nature Magazine (<http://www.nature.com/>)

CD-ROM Data bases: The Library continued to offer network-based CD ROM search services on Campus LAN through a CDNET system. However, 15 pentium machines have also been installed in the Computer Applications Division of the Library to facilitate CD ROM search services from within the Library. These workstations are also used for accessing web-based online electronic journals as well as other electronic resources available on the Internet. The Library subscribes following CD ROM databases:

COMPENDEX Plus 1992 onwards.

(COMPENDEX Plus 1985 - 1991 available on workstations)

Inspec 1990 Onwards

METADEX 1990 Onwards

Derwent Biotechnology Abstracts 1982 onwards

World Textile 1970 onwards

Business Periodical Index 1982 onwards

MathSci 1988 Onwards

Exim India on CD

LISA Plus

Induscope: India's Industry Database

India Business Insight Database, 1993-1999

Indian Standards on CD-ROM

Inter Library Loan (ILL) & Resource sharing facility: On the request of faculty and the students, the Library arrange to procure the books & bound volumes of journals on Inter Library Loan (ILL) from the Libraries in India. Under IITs resource sharing agreement, it also

supplies photocopies of the requisite articles, technical reports, research papers etc free of cost to them.

Photocopying facility: This facility is being operated by a commercial vendor on payment basis. It is available in Serial division, at top floor of the Central Library.

Book Bank facilities: The Book Bank which holds multiple copies of selected textbooks, lends them out to students for a semester against payment of 10% of the price of the books or Rs.20 per book whichever is less. However, the students belonging to Scheduled Castes and Scheduled Tribes are exempted from payment. B.Tech Students belonging to SC/ST. MCM Scholarship and Low Income Group (Basic annual income not exceeding to Rs.37,800) may apply / feed the data in the computer installed in the Text Book Section for the books from Book Bank of Central Library.

Text-Books facility: Text-books are housed at ground floor of Library. These books are issued for overnight only. Students can borrow two books at a time from text book counter between 3 to 5 P.M. Reservation of Text-books is also done 7 days in advance from 9.30 A.M. To 12 noon on working days only. Students can also reserve the books at their own using the computer in Text Book Section.

Library Computer Resources: The Library has its own sub-LAN, which, in turn, is connected to the Campus LAN. The Library has 25 terminals, two terminal controllers, 37PCs (Pentium Pentium II and III) and four servers spread over three floors of the Library. Currently, all 25 terminals, 30 PCs and four servers are connected to the Campus LAN.

Reader's Assistance: To assist the Library users there is one Reader's assistance desk near main entrance at first floor of Library. Official on duty at the readers desk may be contracted for any assistance regarding Book Location, Use of catalogue search, classification scheme, Reference collection, Membership information, Renewal of borrower's tickets / Bar code card, Loss of readers tickets, Loss of books, overdue charges, clearance of

dues , Library rules, or any factual information. For getting some papers of the journals available in other IITs user may also contact at this Desk. In case of specialized information or any difficulty in getting the assistance, the readers may approach Head, Readers' Services division.

Library Computerized Services: The LIBSYS package - a Commercial package, bought in 1998, has been fully implemented for computerization of all the in-house activities in the Library, mainly Acquisition, Circulation, Cataloguing & Serial Control. The data entry of Serial is in progress. The system administration of different interfaces of Library computerization and regular updating of OPAC & Library Home page is done by Computer Application Division of Library.

- Developing Web-based Digitized Collection for distant & Continuing Education in Information Technology: A Demonstrative Project on Internet-based Online Interactive Courseware was funded by the Ministry of Information Technology. The Online Directory of Courseware is already available on the Internet and is being updated regularly.
- Development and Maintenance of Institute Web Page funded by IRD, IIT Delhi has been implemented.

Library Home page services: The Library Home page serves is an integrated interface for all computer and web-based services available from the Central Library, IIT Delhi. The interface, available at the Library Intranet server at "<http://10.116.2.1/iit/index1.html>" and "<http://www.iitd.ac.in/library/>", offers the following computer and web-based services.

- Guide to the Central Library.
- Collections and Library Services.
- Library Layouts and Floor plans.
- Library Hours and Membership.

- Computerization Programme.
- Network Connections.
- Web-based Library OPAC.
- TELNET to DELNET Databases.
- Link to CDNET System on Campus LAN.
- Recent Additions to the Book Collections.
- Web-based access to Full-Text Electronic Journals.
- Link to Collection Digitized in-house

Online Public Access Catalogue (OPAC) facility. The OPAC of Library is operational both on Internet and Intranet. It can access to search more than 1,30,000 bibliographic records of books, available in the library database through Web based search Interface or with widow client of the Libsys on Intra net. The OPAC facility also provides information about new arrivals of issues of journals / supply status of the current journals in the Library (Kardex record of Journals for the year 2001).

In house Library data bases : Library has developed a number of databases in-house using Micro CDS/ISIS package of UNESCO for specialized collections available in the Central Library. These databases have recently been ported to **Javaisis interface** so as to facilitate simultaneous access to the users on Internet and Intranet. These databases are:

- Database of Text Book Collection available in Central Library
- Database of Serials in Central Library, IIT Delhi
- Database of book Bank Collection available in the Central Library
- Database of Ph.D. Theses Submitted to the IIT Delhi

Computerized Circulation system: The Library uses **bar code technology** for computerized circulation system. Every book in the Library bear a bar code tag that is used

for its circulation. Similarly, all categories of users have a bar-coded patron cards. The Library has developed in-house facility for bar coding of books and patron cards.

Budget: Rs. 300,75,000/-for the year 2001. For purchase of books , journals & CD-ROM

Staff : 38. Officers. Head, Library 1, & 3 Deputy & 1 Assistant Librarian (Head Ship by rotation among Dy. Librarians).

It is also having Library Advisory Committee consisting faculty member nomine from each Departments /Centers, Students, Librarians, & two Senate members. The committee helps in planning and policy making of the library including computerization.

Table : IIT, D Library Resources Data Matrix

S.No	Variable	Matrix	Cumulative total
1	Librarian's Status	5	5
2	University Central Computing facilities	5	10
3	Library Computer Application Division	5	15
4	Access to Electronic Journals:	4	19
5	CD-ROM Data bases (ERL Technology):	5	24
6	Bar Coding Technology	4	28
7	Division wise Library Computerization	3	31
8	Library OPAC:	3	34
9	Integrated Library Software	5	39
10	Conversion of Library collection	3	42
	TOTAL	50	42

Phase of Development at Nolan's Six Stage Growth Model = $42/50 \times 6 = 5.04$. Just at the begining of Phase - V.

Group -IV. Deemed University level Institutions in the field of S&T :

Following are the Deemed University level Institution in Delhi.

S.N.	Name of the S&T organization	Abrbreviation
1	School of Planning and Architecture, New Delhi	SPA
2	Teri School of Advanced Studies, New Delhi	TERI

Their detail is given as below:

1. School of Planning and Architecture (SPA)

Address : 4, Block B, Indraprasth Estate, New Delhi - 110002. Established in 1941 as Department of Architecture of Delhi Polytechnics. It was affiliated to the University of Delhi and integrated with the School of Town and County Planning. in 1955. The Government of India , through Ministry of Education and Culture conferred on the School of Planning and Architecture the status of a Deemed to be a University in 1979 under the UGC Act of 1956. The School offers Bachelor's program in Architecture, Physical Planning, and Master 's Programmes in Architectural Conservation, Building Engineering, and Management Engineering planning, Housing, Landscape Arch, Regional Planning, Transport Planning, Urban Design, Urban Planning etc. It is also the centre of Research & Advance studies in the field related to the human settlements. The school attracts the students from all over India and abroad. Fully financed and controlled by MHRD. Short term programmes /QIP programmes are also conducted by the school. There are 69 faculty & 197 supporting staff. There are 443 UG, 240 PG & 26 research students.

Central Computing facilities: Institute Home Page address is " www.indiawatch.org//spa " The school is having Central Computing facility with CAT-5 enabled network. It has 56kbps dial - up bandwidth. The type of Network is PTP. The Switched LAN is available. It has 12

Switched Ports, and 1 Switch (5500catalyst). The virtual LAN is covering only one Center.

No Department is covered by LAN. One Internet Cafe is available.

Library : The school has two wings of libraries - planning , Architecture. The Library working hours are from 8 AM to 8 PM.

The collection: Books & Monographs, 71,000; Maps 1000; Slides 25000; Periodicals on subscription 300; Bound Volumes of Journals 10,000. Xerox copying facility exists. The CDSISIS Library soft ware is being used in the library. There is no OPAC. The library is also having Library committee. The Librarian is in the scale of 888 -13,500. Two Section / Center's library heads are in the scale of Professional Assistant.

Table : SPA Library Resources Data Matrix

S.No	Variable	Matrix	Cumulative total
1	Librarian's Status	3	3
2	Central Computing facilities	2	5
3	Library Computer Application Division	1	6
4	Access to Electronic Journals:	2	8
5	CD-ROM Data bases (ERL Technology):	1	9
6	Bar Coding Technology	-	9
7	Division wise Library Computerization	2	11
8	Library OPAC:	2	13
9	Integrated Library Software	3	16
10	Conversion of Library collection	3	19
	TOTAL		19

Phase of Development at Nolan's Six Stage Growth Model = $19/50 \times 6 = 2.28$. Slightly above Phase -II

2. Teri School of Advanced Studies (TERI)

Address : Darbari Seth Block, Habitat Palace, Lodhi Road, New Delhi-110003.

Established as a trust " Teri school of Advanced Studies" in 1999 by Tata Energy Research Institute. The Teri school of Advanced Studies , New Delhi was declared as Deemed to be University by the MHRD vide F.9-19 u-3 dated October 5,1999. The trust , in exercise of its responsibilities as a Deemed to be University will provide free unrestricted access to all of TERIs physical and human infrastructure as may be required. The courses of studies in the field of Energy studies, Bio sciences, Environmental Sciences, public policies, Resources and sustain ability leading to UG, PG and PhD are under planning.

Computing facilities: Internet connectivity to access World Wide Web. The center also provide a daily online bulletin of News Papers headlines pertaining to energy. The electronic information is collected from online and off-line sources including the INTERNET and organized to build the virtual library collection.

Library : Library collection includes both print and Non print material including electronic media. It provides platform to improve and maintain a presence on the WWW, an online archive of CDs allowing search and multimedia information in the area of energy, environment, and sustainable development of global importance and interest. The library is in initiative stage of development. But it is having long range and short range planning of development specially for strengthening information retrieval facilities by increasing bandwidth and capacity to access INTERNET , Online Databases, and development of linkages with local, regional, national, and international net works to enhance and extend the existing collection, thereby giving way to physical boundaries separating resource centers. A pioneering research Library, its wide range of information resources include:

- Over 14,000 books, reports, and conference proceedings on energy, plant biotechnology, forestry, natural resources and environment;
- around 600 current journal titles (and over 7250 back volumes)
- a large volume of miscellaneous literature, including government documents, standards, pamphlets, reprints press clippings, and annual reports of ministries, companies, research organization, voluntary agencies, and multilateral organization;
- CD-ROM collection of bibliographic references and statistical resources

Table : TERI Library Resources Data Matrix

S.No	Variable	Matrix	Cumulative total
1	Librarian's Status	2	2
2	University Central Computing facilities	3	5
3	Library Computer Application Division	3	8
4	Access to Electronic Journals:	4	12
5	CD-ROM Data bases (ERL Technology):	2	14
6	Bar Coding Technology	4	18
7	Division wise Library Computerization	3	21
8	Library OPAC:	4	25
9	Integrated Library Software	4	29
10	Conversion of Library collection	4	33
	TOTAL		33

Phase of Development at Nolan's Six Stage Growth Model = $33/50 \times 6 = 3.96$. Just near

Phase -I V

Group -V : Libraries of Science & Technology Departments of Central Universities.

Delhi University & JNU are the two Central University Institutions in Delhi which are having are having S&T Departments / Centers. Some of the Departments/ Centers are having full fledged library such as Science Library of Delhi University. A brief description of both the university institutions are given as below:

1. University of Delhi, Delhi -7 (DU)

Address : University of Delhi, Delhi -7., Central University, Visitor : President of India.

The university established as a unitary , teaching and residential university by an act of the Central Legislator in 1922. North Campus is situated in Maurice Nagar, Delhi 7, and its South Campus at Benito Juarez Road, New Delhi -21. Visitor - President of India. The 1952 amendment act of 1952 has made the university a teaching and affiliating university.

The jurisdiction of the university extends over the Delhi State. There are two campuses - North & South campuses. Out of the 66 colleges, 10 colleges also conduct classes in morning as well as evening. 12 Colleges are located on both of the university campuses. A college in Bhutan consisting more than 2,23,000 students is also affiliated with this university. The U.G., P.G. & Research courses are undertaken by its different schools, faculties etc. These courses ranges from B.A. ; B.A. (Hons); M.A. ranges from social sciences to languages, including foreign languages; M.B.E. , B.Lib, M.Lib.; M.Phil, Ph. D. & D.Litt. in different departments. In faculty of Commerce and Business Studies, it includes B.Com, B.Com (Hons), BBS, M.Com, MIB, MHRD, MFC, etc. Under Faculty of education it includes B.Ed., M.Ed., B.Sc. (Phy. Education, M.P.E.S. & B.A. (Elementary Education). In faculty of Interdisciplinary & Applied Sciences, it undertakes courses such as B.A.Sc. , B.Sc.(Hons), M.Sc., M.Tech & Ph. D. Under faculty of Law it includes LLB, LLM, MCL etc. Faculty of Mathematics includes B.A. (Hons), B.Sc (Hon), M.A., M.Sc., B.Sc (Hons)

Computer Science, B.C.A., M.C.A. In faculty of Ayurveda and Unani the courses are Pre-Ayurveda, B.A.M.S., B.U.M.S. In faculty of Medicine includes M.B.B.S., M.D., M.S.D.M., M.C.H. etc. In Modern European Languages, it under takes Certificates, Diplomas & Advance Diploma courses. Almost all the faculties having facility of research. The main research degrees are M.Phil, Ph.Ds, D.Sc, D.Litt, DCL.

Central Computing facility: The central computing facility with Networking and Internet facility is in initiative stage.

Library: In order to support research and academic activities, this university established its library in the very first year of its establishment. The library which began with an initial collection of 1,380 books and 86 current journals titles, has now grown in to a large University Library System over a period of 8 decades. Now its collection of books reached to more than 13.6 lakhs in main campus, and 1,40,000 in south campus. Its membership in both the campuses are more than 40,000. In both the campuses Library systems, the readers attendance is more than 19 lakhs a year.

The university library systems has 24 constituent units. Each unit is having their full fledged library. The staff in the library system is more than 400, comprising Librarians, 8 Dy. Librarians, 29 Assistant Librarians & 2 Documentation Officers, 62 Professional Assistants. The computerization of the library systems is in planning stage. Networking of all the constituents units is in progress. Its Ratan Tata Library is having computerization in advanced stage. Out of the 24 constituents units 10 units are using computer in some of their processing as well as managerial functions of library. The library system is not having its OPAC, there is also no Bar code application in the library.

It is also having Library committee which help in planning and policy making of the library including computerization. The E-mail address of Library is crl@delnet.nic.in

Table : DU Library Resources Data Metrix

S.No	Variable	Matrix	Cumulative total
1	Librarian's Status	5	5
2	University Central Computing facilities	5	10
3	Library Computer Application Division	3	13
4	Access to Electronic Journals:	1	14
5	CD-ROM Data bases (ERL Technology):	1	15
6	Bar Coding Technology	-	15
7	Division wise Library Computerization	1	16
8	Library OPAC:	-	16
9	Integrated Library Software	3	19
10	Conversion of Library collection	1	20
	TOTAL		20

Phase of Development at Nolan's Six Stage Growth Model = $20/50 \times 6 = 2.4$.Phase -III

2. Jawahar Lal Nehru University , New Delhi 67 (JNU).

New Delhi 110067. Central University. Visitor .The President of India.

Established under the JNU Act 1966 (53 of 1966). The Act was brought into force on April 22,1969 and the University was inaugurated on November 14, 1969 by Sh. V.V.Giri, the then President of India. The jurisdiction of the university extends to all over the country. Section 5 (13) of the JNU act empowers the university recognise institutions of learning and award degree. Over the year, the university have recognised fifteen Institutions. In generally under takes courses in P.G. & research levels. Its School of Foreign Languages also under takes UG courses leading to B.A.(Hons).

Library: The library came in to existence in 1969 with nominal collection. This has now increased to 5 lacs volumes and over 2000 Current periodicals titles. The membership of library is over 4000. The library has some rarest unique holdings in French, German, Portugues, Russian, Spanish, Urdu, Arabic, Persian and other Indian languages

The computerization of Library system is in progress. It has separate Computer Lab with servers and Terminals. The software being used are MINI ISIS, CDISIS, and INMAGIC. The computerization of documentation Division, Periodical Division, and Processing Division is in progress. The Library actively participate in DELNET & INFLIBNET by contributing its data base for the union catalogue. This has over 140 library staff members comprising one Librarian, 6 Deputy Librarians in the Readers Scales, 11 Assistant Librarians in Lecturer Scale. The Section's heads are in the Professional Assistant scale in Rs. 5500 - 9000

Table : JNU Library Resources Data Metric

S.No	Variable	Matrix	Cumulative total
1	Librarian's Status	5	5
2	University Central Computing facilities	5	10
3	Library Computer Application Division	5	15
4	Access to Electronic Journals:	3	18
5	CD-ROM Data bases (ERL Technology):	1	19
6	Bar Coding Technology	2	21
7	Division wise Library Computerization	3	25
8	Library OPAC:	3	28
9	Integrated Library Software	3	31
10	Conversion of Library collection	3	33
	TOTAL		33

Phase of Development at Nolan's Six Stage Growth Model = $34/50 \times 6 = 3.96$. Phase -I V

Group -VI. Deemed University level Institutions in the field of Agriculture and Pharmacy :

1. Indian Agricultural Research Institute, New Delhi -12 (IARI)

Address: New Delhi 110012, Deemed University since 1958. Established in 1905 at Pusa in Bihar. following a donation given by Henary Phillips of United State of America to Lord Curzon who was the then Viceroy of India. The main campus of the Institute shifted to New Delhi following severe damage to building at Pusa, Bihar by the earthquake of 1934. The campus is located on a self contained 473 hectors campus of its own, complete with laboratories, library, students hostels, and staff residences. There are 25 Divisions, multidisciplinary centers, e.g. Agronomy, Agricultural Chemicals Genetics, Soil Sciences, Agricultural Chemistry, Entomology, Plant Biotechnology, Plant Pathology, Agricultural Engineering, Nuclear Research Laboratory, Water Technology, Bio Chemistry, Plant Physiology etc. From 1923 to 1958 the Institute had been organizing a two year P.G. Diploma course leading to Associate ship. When the Institute given the Deemed university, its Associate Diploma was replaced in 1958 by Post graduate courses leading to M.Sc. The Institute is undertaking the courses in all branches of Agricultural Sciences leading to MSc & PhD. of the Institute. It also undertake QIP programmes in the form of Summer School, Winter schools, for the in service staff of ICAR Institutions and Agricultural Universities.

Institute Home Page Address : www.iari.ernet.in , I.P. Address. 202.141.78.3 , Institute Web

Site Address : <http://www.iari.ernet.in> , Institute bulletin Board service Address:

<http://pardoo.iari.ernet.in>, Institute Band width (Band width, Communication Link): 1).

64Kbps, RF Link for ERNET., 64Kbps KU board V-SAT from NICNET.13.5 KM Optical Fibre Cable is used from switch to hub and hub to node connectivity. In instant's Networking

systems , the Star Topology is used. The Networking is based on AT & T , and OFC backbone. The Cabeltron Smart Swith is used for Networking, MMAC and hubs. All 25 divisions of IARI are available on LAN. The virtual LAN is operational in all these divisions. Internet Cafe Institute has made available three nodes for web browsing by PG students, and faculty members in the library free of cost.

Library: Working Hours: 9.00 A.M. to 9.00 P.M. The Institute's Central Library has built up a collection of over 6,00,000 consisting books, bound volumes of journals, Technical reports, Theses etc. 450 journals are on subscription. In addition to this it receives more than 5000 scientific serials annually from all over the world and is regarded as one of the Agro biological Library in Asia. The Library is having 10300 Serial files in 40 languages received from more than 90 countries. which form about 30% of the total of scientific serials available in the country. The library is having a special reading hall, Museum, Seminar hall, Sperate room for Internet and CD-NET access facility. In the Library , there is also a separate Documentation Center. DELNET & INFLIBNET Membership. Bar coding is not yet started.

Library Computer Resources: There are 6 CD-ROM data bases on subscription annually. The main CD-ROM data bases available on Campus LAN are: AGRIS (1975 +), Agricola (1970+), CAB Abstract (1972+), Derment Bio Biotechnology Abstract (1982+)

The Library OPAC address: [http:// 202.141.2/8080/](http://202.141.2/8080/) Library Home page Address: pordoo.iari.ernet.in , The Library Software: TLMS 3.9.1. The Acquisition, Circulation and Cataloguing volumes is computerized. The Serial Computerization in progress. The retrospective data entry of books is completed. Day to day data entry work of books and technical is also in progress. There is one Head, Library Services, 4 Librarian, in Dy. Librarian Scale, 10 Technical Officers, 2 Technical officers (T-6) in Rs. 8000 -13500 Scale, 2 Technical Officer in T-5 Scale of Rs. 6500 - 12000 & 19 Assistant Librarian in T-4 Scale

Rs. 5500 -9000. It is also having Library committee which help in planning and policy making of the library including computerization.

Table: IARI Library Resources Data Metrix.

S.No	Variable	Matrix	Cumulative total
1	Librarian's Status	4	4
2	University Central Computing facilities	5	9
3	Library Computer Application Division	4	13
4	Access to Electronic Journals	4	17
5	CD-ROM Data bases (ERL Technology):	3	20
6	Bar Coding Technology	2	22
7	Division wise Library Computerization	3	25
8	Library OPAC	3	28
9	Integrated Library Software	3	31
10	Conversion of Library collection	3	34
	TOTAL		34

Phase of Development at Nolan's Six Stage Growth Model = $34/50 \times 6 = 4.08$. Phase -I V

2. Jamia Hamdard, New Delhi- 62 (JAMIAH).

Address: Hamdard Nagar , New Delhi. Deemed University.

Established in 1989 under sec 3 of the UGC as an Institution Deemed to be University vide Govt. of India Notification of 10th May 1989. . It was conceived as a seat of higher learning by Kareem Abdul Hameed , the founder trustee of Hamdard National Foundation as far back as 1954. Students enrolments is more than 1400.

Central Computing facility: The university has Computer Central facilities. It has UTP CATS Networking, and Star Networked Topology.

Library: The Central Library has collection in Islamic studies, Humanities, Social Sciences, and Sciences and allied subjects. Books 1,5000, Manuscript 4,500, Paper Clippings 2,50,000, Microfilms 15,000, Bound Volumes of Journals 15000, Current Journals 500. The Library is computerized its various activities. It is the member of INFLIBNET.

It is also having Library committee which help in planning and policy making of the library including computerization

Library Home page : www.jamiahAMD.org.edu, Internet facility is available in the library.

Table: Jamia Hamdard Library Resources Data Matrix

S.No	Variable	Matrix	Cumulative total
1	Librarian's Status	3	3
2	University Central Computing facilities	3	6
3	Library Computer Application Division	2	8
4	Access to Electronic Journals	2	10
5	CD-ROM Data bases (ERL Technology):	3	13
6	Bar Coding Technology	2	15
7	Division wise Library Computerization	3	18
8	Library OPAC	3	21
9	Integrated Library Software	3	24
10	Conversion of Library collection	3	27
	TOTAL		27

Phase of Development at Nolan's Six Stage Growth Model = $27/50 \times 6 = 3.24$. Phase -I V

**Group VII. Guru Govind Singh Indraprasth University (GGS & I.P.)
& its affiliated Privately Managed S&T Academic Institutions in Delhi.**

1. Guru Govind Singh Indraprasth University (GGS&IP)

GGS &I.P established by an act IX of 1998 of Government of Delhi as an affiliating and teaching university to facilitate and promote studies, research and extension work in emerging areas of higher education. It is presently located in old campus of Delhi College of Engineering, Kashmiri Gate, Delhi. Its foundation stone has been laid in Chahwala, New Delhi (South Delhi). The University started functioning in December, 1999. Its first Academic year July 200 to May 2000. The university was established with a focus on professional education, including engineering, technology, management studies, medicine, pharmacy, nursing, education, law, etc. and also to achieve excellence in the relevant fields. At present there are 50 faculty and about 100 supporting staff. The total students strength is 500.

Central Computing facility: The central computing facility with Networking and Internet facility is in initiative stage.

Library: The university is new and most of the library collection and services are in process.

Working Hours: 8.30 A.M. to 8.00 P.M. **Collection:** Books 10,000, **Periodicals:** No. of Current journal's titles 180, Bound volumes Nil . For access to Electronic Journals & CD-ROM facility the infrastructure is being developed. In Library there are 10 PC (Pentium). The Trodon Software is being used for Library Computerization. The Library Computerization is being introduced in a planned way. The Bar coding of all the books & Readers tickets are being done side by side. Presently all the books and members records are

well bar coded. The library is the member of DELNET. It is also having Library committee which help in planning and policy making of the library including computerization.

Table : Library Resources Data Matrix

S.No	Variable	Matrix	Cumulative total
1	Librarian's Status	5	5
2	University Central Computing facilities	2	7
3	Library Computer Application Division	1	8
4	Access to Electronic Journals	2	10
5	CD-ROM Data bases (ERL Technology):	2	12
6	Bar Coding Technology	2	14
7	Division wise Library Computerization	3	17
8	Library OPAC	3	20
9	Integrated Library Software	3	23
10	Conversion of Library collection	2	25
	TOTAL		25

Phase of Development at Nolan's Six Stage Growth Model = $25/50 \times 6 = 3.00$ (Phase -III)

Following are the educational Institutions in the field of S&T affiliated to GGS Indraprastha University:

S.N.	Name of the S&T organization	Data Matrix (Wt.50)	Nolan's six Stage Growth Model
1	GGS Indraprastha University, Delhi	25	3
1	Amity School of Engineering & Technology, Delhi	15	1.8
2	Ansal Institute of Technology (AIT), Gurgaon	19	2.28
3	Banarsidas Chandiwala Institute of Hotel Management & Catering Technology	17	2.04
4	Banarsidas Chandiwala Institute of Information Technology	18	2.16
5	Bharti Vidyapeeth's College of Engineering	17	2.04
6	COMMIT - IT Career Academy	18	2.16
7	Delhi Institute of Advance Study	18	2.16
8	Delhi School of Professional studies & Training	16	1.92
9	Electronic Research and Development Centre	19	2.28
10	Gittaratan Institute of Advance Studies & Training	14	1.68
11	Guru Nanak Institute of Management	14	1.68
12	Guru Prem Singh Memorial College of Engineering	16	1.92
13	Guru Teg Bahadur Institute of Technology	15	1.8
14	Ideal Institute of Technology and Management	16	1.92
15	Institute of Information Technology and Management	15	1.8
16	Institute of Management Science and Productivity	16	1.92
17	Institute of Rehabilitation Sciences Medicine & Allied Sciences	13	1.56
18	Kalka Institute of Research & Advance studies	14	1.68
19	Madhubala Institute of Communication and Electronic Media	14	1.68
20	Maharaja Agrasen Institute of Technology	19	2.28
21	Maharaja Surajmal Institute	19	2.28
22	New Delhi Institute of Information Technology	17	2.04
23	R.C. Institute of Technology	13	1.56
24	Rukmini Devi Institute of Advance Studies	14	1.68
25	Sirifort College of Computer Technology	13	1.56
26	Sushant School of Art & Architecture, Gurgaon.	19	2.28
27	T.V.B School of Habitat Studies	17	2.04
27	Vastu Kala Academy	14	1.68

Phase of Development at Nolan's Six Stage Growth Model. The GGS & I. P University Library is in Phase III. It's Computerization work is quite systemic. Its affiliated institution's data matrix is between 13 to 19, which shows Phase I of the growth of IT applications at at Nolan's Six Stage Growth Model.

A brief description of some affiliated academic Institution of GGG & IP university is given as below:

1. Amity School of Engineering and Technology

Amity School of Engineering & Technology

Amity Campus, M-44, Saket, New Delhi 110 017

Web Site Address : www.amity.edu/aset

Amity School of Engineering and Technology (ASET), an institution of the Ritnand Balved Education Foundation (RBEF), affiliated to the GGS Indraprastha University, Delhi, is the first institution to qualify for running the B.Tech Programme. The first session which commenced in the year 1999, admitted 240 students according to the regulation of the GGS Indraprastha University.

Phase of Development of IT in its Library at Nolan's Six Stage Growth Model =

$15/50 \times 6 = 1.5$ (Phase -I)

2. Ansal Institute of Technology (AIT). Gurgaon.

Ph.91-636 8069.636 8070

Email:mpsingh3@hotmail.com

The Ansal Institute of Technology (AIT) established by the Charanjiv Charitable Trust. The Institute has acquired 14 acres of land in Sushant Lok, Gurgaon where world class facilities like modern lecture theatre, state of the art computer lab, Audio-Visual rooms, well stocked multi-media library, accommodation etc. are being set up at the AIT premises. The campus offer the best available online facilities and high-speed connectivity to the Internet to ensure that students and faculty can easily interact with their counterparts in other institutions

in India & abroad. The wired campus will allow members of faculty to use the latest instructional techniques as well as encourage institutional/individual collaboration on research.

Phase of Development of IT in its Library at Nolan's Six Stage Growth Model =

$19/50 \times 6 = 2.28$ (Phase -II)

3. BANARSIDAS CHANDIWALA INSTITUTE OF HOTEL MANAGEMENT & CATERING TECHNOLOGY

(Approved by AICTE and affiliated to G.G.S. Indraparastha University)

Chandiwala Estate, Maa Anandmai Marg, Kalkaji, New Delhi 1100019

Ph:6826231 E-mail:hm@chandiwalaestate.com

Website:www.chandiwalaestate.com

Banarsidas Chandiwala Institute of Hotel Management & Catering Technology is situated in lush green pollution and noise free atmosphere of Chandiwala Estate. The Institute is easily accessible from all parts of the city. This is the only recognized Institute in Delhi, which is offering four years Degree Course in Hotel Management & Catering Technology.

Institute has well - equipped state-of-the art training kitchen, a training restaurant with display bar counter, front office with all modern equipments and software packages, computer laboratory, well -stocked air-conditioned library and spacious classrooms, laundry facilities and latest housekeeping equipment. In Chandiwala Estate there are two well-designed restaurants and a 40 room Deluxe Guesthouse, well equipped Health Club, 250 seated Auditorium, conference rooms of different capacities managed by Banarsidas Chandiwala Sewa Smarak Trust Society where students can sharpen their skills in different divisions of hotel operations and its maintenance. Such "in campus" facilities are not

available with any other college in Northern India and routine training in above area gives our students exposure to guest handling.

Phase of Development of IT in its Library at Nolan's Six Stage Growth Model =

$$17/50 \times 6 = 2.04 \text{ (Phase -II)}$$

4. Banarsidas Chandiwala Institute of Information Technology.

Chandiwala Estate, Maa Anandmai Marg, Kalkaji, New Delhi 110019

Ph:6826204 .Website: www.chandiwalastate.com

Established in 1999, has the mission "to develop globally competitive and high quality software professionals through intense training in the upgraded curriculum of information technology and sharpen their skills in business management too. The Institute has its own aesthetically landscaped building located midst 10 acres of picturesque and eco-friendly environment. The Institute, being centrally located in the Chandiwala Estate, Kalkaji, Delhi is very well connected by the public transport and is easily accessible from all parts of the city. The Institute is imparting Master of Computer Applications- a three year post graduate degree programme. The degree programme has been duly approved by the All India Council for Technical Education and is affiliated to the guru Gobind Singh Indraprastha University, Delhi. The prestigious approval by AICTE for increase in intake of students from 40 to 60 from year 2001-02 speaks volumes about the quality of education, course curriculum, dedicated team of the Director and distinguished Faculty and unparalleled infrastructural facilities available at the Institute.

Phase of Development of IT in its Library at Nolan's Six Stage Growth Model =

$$18/50 \times 6 = 2.16 \text{ (Phase -II)}$$

5. BHARATI VIDYAPEETH'S COLLEGE OF ENGINEERING (BVCOE)

A-4, Paschim Vihar, New Delhi-110 063

Phone:5678444,5675436,5678443 Fax:5678444

Bharati Vidyapeeth which is our parent body, was established in May 1964 by Hon'ble Dr.Patangrao Kadam with a wider objective of transformation through dynamic education through an institutional network. Bharati Vidyapeeth has made astonishing strides in the field of education during a short span of 36 years with more than 136 institutions in Maharashtra.

Acknowledging the excellence, the Human Resource Department of Central Government, on the recommendation of University Grants Commission, New Delhi has accorded the status of a Deemed University to eleven faculties of Bharati Vidyapeeth in April 1996. After getting approval from AICTE and affiliation from Guru Gobin Singh Indraprastha University, New Delhi, Bharati Vidyapeeth started College of Engineering at Bharati Vidyapeeth's Educational Complex, New Delhi in Pashim Vihar with three different programmes(1) Information Technology(2) Computer Science & Engineering (3) Electronics & Communication Engineering.

Phase of Development of IT in its Library at Nolan's Six Stage Growth Model = 17 /

50 x 6 = 2.04 (Phase -II)

6. COMM -IT (Commitment to Quality)

71/86, Main Road, Zakir Nagar, New Friends Colony,

New Delhi-25 Ph.:6317864 (5 Lines)

E-mail:committi@bol.net.in

COMM-IT Academy ever since its inception has been involved in providing high quality IT related training. The culture of COMM-IT is based on strong integration of state of the art hardware, software and that intangible 'mindware' - where change is the only constant, "COMMITMENT TO QUALITY" Being the motto, professionals associated with the institute have been striving hard to maintained the highest standards in the field of Training, Consultancy and Software Development. COMM-IT is working with the mission of providing close association of the student with the industry during their entire curriculum. COMM-IT trains the students in the latest cutting edge technologies under association with major vendors like Microsoft, Oracle etc. Learning has been treated as an "Information Discovery" rather than a book cramming mental inertial session. It is having alliances with major software Vendors like Microsoft and Oracle is better place in providing the much needed industry interface to the students during the entire B.I.S. curriculum. In view of this the Institute is organising workshop where students are exposed to the industry in the current session. The Institute has been providing windows 2000 Networking Programme based on Microsoft.

Computer Facilities: **Server:** HP NET SERVER LC3 PIII 550 MHZ,2*9.1 GB HDD with other standard configuration. **Nodes:** 50 Nodes all HP BRIO BAX and COMPAW MACHINES. **NETWORKING :** Machines are Networked using state-of-art switches.

CAMPUS: The Institute is coming up with a sprawling campus, at FC-31 Sheikh Sarai, N.Delhi. which has been designed keeping in mind all the modern infrastructural

requirement like auditorium/seminar hall, hi-tech classroom modern computer lab facilities, including high-speed inter-network and Internet connectivity, thereby exposing our students to the latest technology in the IT Industry. The B.I.S. curriculum will be sifted to its main campus very soon.

Phase of Development of IT in its Library at Nolan's Six Stage Growth Model =

$18/50 \times 6 = 2.16$ (Phase -II)

7. DELHI INSTITUTE OF ADVANCED STUDIES

Sector 13, Rohini , New Delhi 110085

Web site : <http://www.diasedu.com>

Affiliated with G.G.S. Indraprastha University. Established by Shri Laxman Das Sachdeva Memorial Education Society, The Institute is providing dynamic learning environment that is changing in response to changing needs of society. At DIAS, pursuit of excellence is a way of life. The guiding philosophy behind all the academic activities of the Institute is to inculcate professionalism in management and to professional excellence through ethics, passion and perseverance.

Phase of Development of IT in its Library at Nolan's Six Stage Growth Model =

$18/50 \times 6 = 2.16$ (Phase -II)

9. ELECTRONICS RESEARCH & DEVELOPMENT CENTRE OF INDIA, (ER &DCI)

(Ministry of Information Technology, Govt of India)

Affiliated to G.G.S.I.P. University, Delhi

Anusandhan Bhawan, C-56/1, Sector-62, Noida-201301

Phone No.91-11-91-4587717-23, Fax:91-11-91-4587726

Electronics Research & Development Centre of India (ER&DCI) is a Registered Scientific Society under Ministry of Information Technology, Govt. of India, with three constituent units located at Calcutta. Thiruvananthapuram and Noida. The Noida unit undertakes application oriented, region specific research, design, development engineering and prototype development in the areas of Electronics Hardware, Computer Software and Communication systems. The unit also undertakes System Engineering and Consultancy services on trunkey basis and Human Resource Development in hitech areas, Electronic Governance-Embedded systems, Infrastructure Support Services-ERP/CRM.

The unit was established with the mandate to undertake and promote State-of-the-Art, Scientific Research and development in Electronics and to design & develop electronics equipment and systems for the growth of Electronics Industry to remain competitive in the global market.

Phase of Development of IT in its Library at Nolan's Six Stage Growth Model =

19/50 x 6 = 2.28. (Phase -II)

10. GITARATTAN INSTITUTE OF ADVANCED STUDIES AND TRAINING

Rohini, Delhi-110085

Phones:705772,7057733, 7052244 Fax:7052233, Email:gita_rattan@rediffmail.com

GIAST was established by the Rohini Educational Society in 1992 by starting Nursery Teachers Training Institute. It caters all the needs of education in the Society providing opportunities for students to extend as well as deepen their knowledge and understanding of education.

Phase of Development of IT in its Library at Nolan's Six Stage Growth Model = 14 /

$50 \times 6 = 1.68$ (Advance Phase -I)

11. GURU NANAK INSTITUTE OF MANAGEMENT

(Approved by AICTE, Ministry of HRD, Govt. of India . Affiliated to Guru Gobind Singh Indraprastha University)

Road No.75, PUNJABI BAGH, NEW DELHI-110026

TEL; 5158927, 5178362, 5159154 FAX:5158926 E.MAIL:gnim2k@yahoo.com

This prestigious institute, started under the aegis of Delhi Sikh Gurudwara Management Committee, a premier welfare organisation, processes fully air-conditioned & State of the art internet Linked Computer Centre, Library and other relevant infrastructure.

Phase of Development of IT in its Library at Nolan's Six Stage Growth Model = 14 /

$50 \times 6 = 1.68$ (Above Phase -I)

12. GURU PREMSUKH MEMORIAL COLLEGE OF ENGINEERING

Sector - 13, Rohini, New Delhi - 110085

Ph.: 7860701, 7860801.

Guru Premsukh Memorial College of Engineering (GPMCE), Established by Bhagwan

Mahavir Educational society Regd. ((BMES) has been approved by the AICTE and Affiliated
to Guru Gobind Singh, Indraprastha University, Delhi.

Phase of Development of IT in its Library at Nolan's Six Stage Growth Model =

$16/50 \times 6 = 1.92$ (Near Phase -II)

13. GURU TEGH BAHADUR INSTITUTE OF TECHNOLOGY

Block NO.20, Tilak Nagar, New Delhi - 110018

PH. 5412644, 5166016, 5915469

Approved by AICTE & affiliated with Guru Gobind Singh Indraprastha University.

Conducts degree courses leading to B.Tech. degrees in: i) Computer Science & Engineering;
ii). Information Technology; iii) Electronics & Communication Engineering

Phase of Development of IT in its Library at Nolan's Six Stage Growth Model =

$15/50 \times 6 = 1.8$ (Near Phase -II)

14. IDEAL INSTITUTE OF MANAGEMENT AND TECHNOLOGY

124, FUNCTIONAL INDUSTRIAL AREA,

PATPAR GANJ, DELHI-1100092

The ideal Institute of Management and Technology, Delhi is affiliated to G.G.S. Indraprastha University and has emerged as a premier institution of Computer Science, Information Technology, Teacher Education and Management Education. The Institute is destined to a diverse and dynamic growth.

Phase of Development of IT in its Library at Nolan's Six Stage Growth Model =

16/50 x 6 = 1.92 (Near Phase -II)

15. INSTITUTE OF INFORMATION TECHNOLOGY & MANAGEMENT, A037 A, Kirti Nagar New Delhi 110015

Te.5168102.5934330

Affiliated to the GGS Indraprastha University.Delhi. Center of excellence in academics, training, R&D and consultancy in emerging specialized areas of Computer Science, Information Technology and Management. State of the art computer center with 40 nodes LAN. Internet connection on dedicated ISDN line.

Phase of Development of IT in its Library at Nolan's Six Stage Growth Model =

15/50 x 6 = 1.8 (Near Phase -II)

16. Institute of Management Science & Productivity Research

(Delhi Productivity Council)

1 E/10, Jhandewalan Extension, New Delhi-110055

E.Mail:dpc@del3.vsnl.net.in Website www.dpcmanagemeninstitute.com

Approved by ICSTE, Ministry of HRD, Government of India and affiliated to Guru Gobind Singh Indraprastha University. Delhi Productivity Council (DPC) was established in 1959 as part of the Productivity Movement in India. It has a Tripartite character (equal representation of Government, Employers and Trade Unions) and is an autonomous non-Profit making body. It has linkages with National Productivity Council, Asian Productivity Organisation, Tokyo and World Confederation of Productivity Sciences, Montreal, Canada. Promotion of Productivity in all spheres of economic activity To run educational institutional for imparting Management, Productivity Research and other Educational Courses / Programmes through classroom teaching and distance learning without any profit motive. Provision of assistance to various organization is manufacturing as well as service sector.

Phase of Development of IT in its Library at Nolan's Six Stage Growth Model =

$16/50 \times 6 = 1.92$ (Near Phase -II)

17. INSTITUTE OF REHABILITATION MEDICINE & APPLIED SCIENCES (IRMAS) , JC-36, Khirki Extension, Malviya Nagar, Delhi-110017

Telefax:6671664, 6685740, 66811750.

Affiliated to the GGS Indraprastha University. Offers Bachelor of Physiotherapy, a 4 1/2 years duration professional degree course. It has been planned to establish a complete Institutional set-up to meet its commitment of a model educational and rehabilitation services. Facility of teaching, lectures halls, laboratories, library.

Phase of Development of IT in its Library at Nolan's Six Stage Growth Model =

$$13/50 \times 6 = 1.5 \text{ (Phase - I)}$$

18. KALKA INSTITUTE FOR RESEARCH & ADVANCED STUDIES (KIRAS)

Alaknanda, New Delhi-110019

Phone:6449438,6424080,6482625

Affiliated to the GGS Indraprastha University. Set up by Kalka Educational Society, Delhi a non-profit making body, registered under the Societies Registration Act, 1860 and comprising a group of enlightened academician, businessmen and industrialists. Offers under graduate courses in Information Science, Computer sciences.

Phase of Development of IT in its Library at Nolan's Six Stage Growth Model =

$$14/50 \times 6 = 1.68 \text{ (Phase -I)}$$

19. Madhu Bala Institute of Communication and Electronic

Media., Bharat Scouts & Guides Camping Grounds, Nizammudin East, New Delhi -13.

Telephone: 465 5645, 64922526, 6492627

Affiliated to the GGS Indraprasth University. Offers Undergraduate courses in mass communication, and shoryt term courses in Television / Radio/Newspapers / Magazines / Event Management / Advertising/ Copy Writing/ Public Relations/ Internet & Internet portals.

Phase of Development of IT in its Library at Nolan's Six Stage Growth Model =

14/50 x 6 = 1.68 (Phase -I)

20. MAHARAJA AGARSEN INSTITUTE OF TECHNOLOGY

Geeta Chowk, Sultan Puri, Delhi-110041

Telephone nos.5489491,92,93,94:fax No:5489494

email:maitech@bol.net.in

Affiliated to to the GGS Indraprasth University. Offers under graduate courses I. Maharaja Agrasen Institute of Technology(MAIT) has been established by Maharaja Agrasen Technical Society promoted by a Group of well known Industrialists, Businessmen, Professionals and Philanthropists with an aim to promote quality education in the field of technology. The promoters of the society have been involved in various activities related to the promotion of basic and professional educational and health care and have established a number of education Institutions consisting of Engineering College, Polytechnic, I.T.I. etc. They are also managing 5 public Schools at various locations in Delhi. They have already setup a 300 bedded Maharaja Agrasen Hospital fully equipped with modern and

sophisticated machines in Delhi and running a Medical College, Nursing College and Hospital in Agroha, Haryana.

Phase of Development of IT in its Library at Nolan's Six Stage Growth Model =

19/50 x 6 = 2.28 (Phase -II)

21. MAHARAJA SURAJMAL INSTITUTE

C-4, JANAK PURI, NEW DELHI-58

Phones: 528116(Direct) 5552667

The Institute is a non-profit, quality conscious and trend setting institute with focus on providing equal opportunities for development of human potentials of every segment of society including the differentiated one. The Institute has been established through the dedicated and selfless endeavour of educationists and institute builders who are deeply concerned with the standards of education and are determined to upgrade the quality, content and direction of education. The Institute is a venture of its own kind where educators and professionals have joined hands to aid and direct the agenda of education. The Institute is offering BBA(H), BIS(H) & B.Ed. Programme affiliated to Guru Gobind Singh Indraprastha University.

Phase of Development of IT in its Library at Nolan's Six Stage Growth Model =

19/50 x 6 = 2.28 (Phase -II)

22. NEW DELHI INSTITUTE FOR INFORMATION TECHNOLOGY

Founded by the Society for Computer Education and Management Studies & Affiliated to Guru Gobind Singh Indraprasta University. Conducts the BACHELOR OF INFORMATION SYSTEMS (HONOURS) course of the University. It is equipped with the Air-conditioned software lab, equipped with the latest Pentium III computers and licensed software. The management of the Institute and its advisory board consist of competent individuals drawn from the fields of education and training, administration, finance and industry. Their experience and vision have contributed to shaping the growth and functioning of NDIIT. .

Phase of Development of IT in its Library at Nolan's Six Stage Growth Model =

$$17/50 \times 6 = 2.04 \text{ (Phase -II)}$$

23. R.C. Institute of Technology

Pre Nursery, Gopal Nagar, Najafgarh, New Delhi-110043

Ph.5011691

RCIT was started in the fond memory of an educationist Late Shri Ramchander Gahlot. The aim was to provide a state of the art education in this rural area, the district of Delhi. This area had no higher learning institution. Considering the importance of Information Technology, it was decided to first launch a base level course of BIS(H) in the new millennium as a co-operative venture with GGS IP University Delhi for training & educating of young men and women in this most growing & popular discipline.

Phase of Development of IT in its Library at Nolan's Six Stage Growth Model =

$$13/50 \times 6 = 1.56 \text{ (Phase -I)}$$

24. Rukmini Devi Institute of Advanced Studies

2A & B, Phase-I, Madhuban Chowk, Rohini, Delhi-110085

Rukmini Devi Institute of Advanced Studies (originally R.D. Institute of management studies) is the professional management Institute run by Seth Pokhar Mal Educational Society (Regd.). RDIAS is approved by AICTE, HRD Ministry, Govt. of India & Affiliated to GGS Indraprastha University . The Institute stared in 1996 focuses on the need accomplished managers by emphasizing on individual attention in a positively oriented environment aiming to excel in the global economy. It initially offered AICTE approved two-year P.G. Diploma in Management . Currently it is offering the 2-year MBA programme of GGS Indraprastha University, Delhi with specialization in Marketing, International Business, Information Technology (IT) and Finance.

The Institute, located in Northwest Delhi at Madhuban Chowk crossing, Rohini is housed in a ultramodern four-story building facing Outer Ring Road with all modern amenities and teaching facilities in own campus measuring about 0.9 acres. Existing facilities include state of art Computer with state-of-art audio-visual facilities, spacious well furnished class rooms and tutorial rooms, common room both for Boys and girls, with independent facilities for Administrative Unit.

Phase of Development of IT in its Library at Nolan's Six Stage Growth Model =

$$14/50 \times 6 = 1.68 \text{ (Phase -I)}$$

25. SIRI FORT COLLEGE OF COMPUTER TECHNOLOGY &
MANAGEMENT

(Affiliated to G.G.S.Indraprastha University)

Sirifort Tower, 256,257, Shahpur Jat, New Delhi-110049

The Sirifort College of Computer Technology and Management established by Suraj Singh Risal Singh Memorial Trust with the mission of providing higher education to the education to the students especially those belonging to the category of poor and under privileged sections of the society. The Trust aims at imparting vocational and job oriented education to students to help them equip better for respectable placement in society. The college has presently selected computer as the thrust area, but plans to introduce more job oriented courses later to help students attain the highest intellectual acumen. The aim is to establish an institution of repute sound in academic excellence.

The college is located at a central location in South Delhi flanked on one side by Panchsheel park and Hauz Khas on the other in a multistoreyed building close to the Sirifort. Location of the institution is such that it caters to the needs of all sections of the society desirous of securing academic knowledge in job oriented courses.

Phase of Development of IT in its Library at Nolan's Six Stage Growth Model =

13/50 x 6 = 1.56 (Phase - I)

26. SUSHANT SCHOOL OF ART AND ARCHITECTURE

(Affiliated to GGS Indraprastha University, Delhi: Affiliate Member of ACSA Washington DC)

Sushant Lok, District Gurgaon-122 001, Haryana

Tel: 6385896,6385346 Fax:6385049 Email:suchant@nde.vsnl.net.in

Sushant School of Art & Architecture was established in September 1989., Located in green setting of Sushant Lok on the outskirts of Delhi, the school has evolved into a centre for excellence in Architecture. The school offers a 5 years Degree Programme leading to Bachelor of Architecture. The School is affiliated to guru Gobind Singh Indraprastha University. The School is an affiliate member of the Association of the Collegiate Schools of Architecture, Washington, USA.

Phase of Development of IT in its Library at Nolan's Six Stage Growth Model =

$19/50 \times 6 = 2.28$ (Phase -II)

27. The T.V.B. School of Habitat Studies

(Architecture, Urban Design, Building Construction)

Sector-D, Pocket II, Vasant Kunj, New Delhi-110 070

Telefax:91-11-689,689 6615 : Email:tbbshs@vsnl.com

The TVB School of Habitate Studies stands among the premier schools of Architecture in India. Established in 1990 under the aegis of the Vidya Bharati Education Society. It was started by a group of prominent and experienced architects from Delhi, With the objective of imparting a new relevance of architectural education in India and to promote a professional role in consonance with the needs of the society. Its educational philosophy has been, first to develop knowledge and competence through an integrated program of teaching and research, grounded in a value based enquiry into the processes of

change in a developing society, and secondly, to promote the potential of architecture as a broad-based academic and professional field which enables each individual to develop post-graduate studies in India and abroad. They have demonstrated the value of the schools philosophy in the tremendous variety of professional roles in which they have found success and satisfaction. the School's academic standards are widely acknowledged. The School is now affiliated to Guru Gobind Singh Indraprastha University and offer a five-year program leading to a B.Arch. Degree in Architecture.

Phase of Development of IT in its Library at Nolan's Six Stage Growth Model =

$$17/50 \times 6 = 2.04 \text{ (Phase -II)}$$

28. Vastu Kala Academy

Affiliated to G.G.S. Indraprastha University

A constituent of the Institute for Socialist Education (Regd.)

Vastu Kala Academy was established in 1993 by the Institute of Socialist Education. It is affiliated to GGS Indraprastha University, which awards the students a B.Arch. Degree of the end of a five year program. The first batch of architects from vastu kala academy are going to pass out in first held of 2001.

The Institute is located in one the most picturesque part of South Delhi and is well served by public transport. The Academy is ideally located in immediate vicinity of prestigious institutions like IIT Delhi, JNU , National Institute of Health Education, Institute of Immunology , Institute of Mass Communication etc. This creates the right ambiance for a place of higher learning and is ideal from the point of view of academic interaction.

Phase of Development of IT in its Library at Nolan's Six Stage Growth Model =

$$14/50 \times 6 = 1.68 \text{ (Phase - I)}$$

Group -VIII : Libraries of Central Universities specialized in Media & Communication Technology.

Following two universities are having specialized departments/ Centers in Communication Technology.

S.N.	Name of the S&T organization	Abrbreviation
1	Indira Gandhi National Open University, New Delhi	IGNOU
2	Jamia Millia Islamia, New Delhi	JAMIAM

IGNOU is having well equipped Central Library. In addition to this, the libraries of School of Continuing Education, School of Computer & Information Sciences both are having good collection on Communication technologies. The Jamia Millia Islamia is also having its Central University Library. Mas Communication Research Center of Jamia Millia Islamia is also having a well equipped library with good collection on Communication Technologies. A brief detail of both the University Library is given as below:

1. Indira Gandhi National Open University, New Delhi - 8 (IGNOU)

Address : Maidan Garhi, New Delhi-68, Visitor : President of India

Established in September 1985 by an act No 50 of the parliament., The jurisdiction of the university extends to whole of India. The University campus is located on a 150 acres site at Maidan Garhi in south Delhi. Its main mode of teaching is through distance education systems utilizing diversity of means which includes study material, modern communication technology, Contact programmes, & assignments etc. All study centres are equipped with VCR, TV, and audio tape. The lectures are also broad caste through national channels of Doordarshan. The University's audio and video programmes are in its studio.

The university offers both short term and long term courses study leading to certificate, Diploma, and Degree covering conventional and innovative professionals programmes. The main courses of study are B.A. , B.Sc, B.C.A., B.Tech, BIT, M.A., B.Lib, M.Lib, M.C.A. M.B.A., PG. Diploms, Certificates, and job oriented courses.

Central Computing facility: The central computing facility with Networking and Internet facility is in initiative stage. VAX 8530 computer is installed as central computing facility to which the existing PCs are connected to facilitate transfer of data from one system to another. Micro VAX system supporting optical mark reading scanners installed for computer marked examination and assignments. Regional are also having PCs as part of decentralized process. The Computer Division provides the following services to the Schools, Divisions and Regional Centres:

- Acquisition, installation and maintenance of IT resources
- LAN/WAN
- Internet Activities
- IT Training

The division has installed a total of 700 desktop computers and 200 peripherals apart from 16 higher-end servers in the University. All support acquisition, installation, maintenance, operation and utilisation are provided by the Computer Division. As per the target more that twenty Regional Centres will be well equipped with state of the art IT facility which includes higher end servers, desktops, peripherals, latest software's and dedicated lease line for Internet access and cyber centres. IGNOU headquarters has a campus Local Area Network which has now been extended to include SSC, DEC building, block 14 EMPC, SOET and CMD. This LAN has Windows 95/98, Win2K professionals as different platforms. Systems and Network administration is being done by the staff of computer division. Access to Internet is available through 2MBPS Radio-link and all the staff members of IGNOU can access e-mail or the

web through their desktops. In Internet Activities, the University has a comprehensive web site at www.ignou.org which contains online results and all relevant information regarding courses offered by IGNOU. The mail server has also been configured. To help the students in solving their problems e-mail with the programme code have been created so that students can contact the programme coordinators directly. In IT Training, the division has conducted several in-house training programmes which range from administration of Windows NT Introduction to E-mail and MS-Outlook, to proficiency in MS-Office. Some training programmes on software and on e-commerce have also been conducted with the help of Microsoft and Satyam.

Library Documentation Division : The Library and Documentation Division (L&DD) comprises the Central Library at the headquarters as well as at the Regional Centres (RCLs) and Study Centre Libraries (SCLs). The Central Library caters to the needs of academics, administrative and support staff while the RCLs look into the library requirements of staff, academic concealers and academic coordinators at Regional Centres: the SCLs are meant primarily for students. The Central Library of IGNOU has computerised its housekeeping activities using LibSys package. The complete catalogue of the library is now available in computer readable form. L&DD has procured CD-NET-TNT Server 2000 with a capacity of stacking 28 CD-ROMs at a time. IGNOU library members can browse, scan and download information from their desks without coming to the library as the Server has been connected to the University's LAN. One multilingual terminal is available at the library for handling Hindi and other regional language books. The Central Library has a micro form reader-cum-printer through which documents in the form of microfiches and microfilms can be consulted. In order to provide library services to IGNOU students, an initiative has been taken to start IGNOU Learning Resource Centre at some public libraries in Delhi. The following services are offered by the Central Library. Reading, Lending, References,

Referral, Inter Library Loan, Documentation, Bibliographies, Online Public Access Catalogue (OPAC), CD-ROM based services, Microform search facility, Internet based and Delnet based services, Reprographic, Lamination, Spiral binding facilities and CD-Networking services. The Library has brought out a publication on the contents of Distance Education journal, 1998 & 1999. As on 31.3. 2001, the Central Library has 68,256 books and 6063 bound volumes of journals, 511 periodicals, 91 CD-ROMs on subscriptions.

Library Computing facilities : The computerization of the library systems is in implementation stage. The Bar Coding technology has also been introduced. The LIBSYS integrated software for Library computerization.

Table : IGNOU Library Resources Data Matrix.

S.No	Variable	Matrix	Cumulative total
1	Librarian's Status	5	5
2	University Central Computing facilities	4	9
3	Library Computer Application Division	3	12
4	Access to Electronic Journals	3	13
5	CD-ROM Data bases (ERL Technology):	2	15
6	Bar Coding Technology	4	19
7	Division wise Library Computerization	3	22
8	Library OPAC	3	25
9	Integrated Library Software	4	29
10	Conversion of Library collection	3	32
	TOTAL		32

Phase of Development at Nolan's Six Stage Growth Model = $32/50 \times 6 = 3.84$ Advanced stage of Phase -III.

2 Jamia Millia, New Delhi - 25 (JAMIAM)

Address : Mohammad Ali Jauhar Marg, Jamia Nagar, New Delhi -25, Visitor : President of India .

Established in 1920 at Aligarh in 1920 as an offshoot of the Khilafat and Non Cooperation Movement, in response to an urge to boycott the British system of education. In 1962, the UGC gave Jamia Millia as Deemed University status. The same year it was shifted to Delhi in its present campus. Since 1977, when PG courses in Humanities & Social Sciences were started , there had been a continuous academic expansion. It was given the status of central university by an act of Parliament on December 26, 1988. It has UG, PG & Research facilities. Its academic session is from July -June.

The Jamia has undergraduate and PG courses in many subjects spread over six faculties. : Education, Natural Sciences, Engineering and Technology, and Law. The Jamia has also established a Mass Communication Centre which is pioneering centre imparting instruction in Radio, Audio Visual, Television, and Film production. The university is also having Centre of Information technology. The enrollment of students is 4015 in UG, 1750 in PG, and 65 in research programmes. Computing Facility: Institute IP Address : 198.17.62-2. Institute Web Site JMI.N10.IN. The campus Networking is available.

Library : The name of its central Library is Dr. Zakir Hussain Library. It had a collection of 2,60,00 books, and bound volumes of journals. It receives over 500 titles of current journals. It has 75 Video cassettes. It is not having video viewing facility. The Library is specializing in oriental subjects and it has a collection of private papers, and on published work of Maulana Mohamand Ali, Maulana Shaukat Ali, Hakeem Ajmal Khan, Dr. M.A. Ansari, Jigar Moradabadi, and many other eminent persons. The Library has microfilm and

micro card readers, Xeroxing facilities. It also provides interlibrary loan facility. Working Hours: 9.00 A.M. to 5.30 P.M.

Library Computerization: The integrated computerization is in initial stages., It has a server with 13 terminals. The application of computer is started in cataloguing work of started. Its List of Additions are available on Computer. It is also having DELNET and INFLIBNET membership. The Bar coding related work is in planning stage. The Library Software being used in the library are LIBSIS, CDISIS, UTLS.

Library OPAC Address: jmi@delnet,ven.nicenet.in

Table : Library Resources Data Matrix of Jamia Millia Islamia

S.No	Variable	Matrix	Cumulative total
1	Librarian's Status	3	3
2	University Central Computing facilities	4	7
3	Library Computer Application Division	3	10
4	Access to Electronic Journals	-	10
5	CD-ROM Data bases (ERL Technology):	1	11
6	Bar Coding Technology	2	13
7	Division wise Library Computerization	2	15
8	Library OPAC	1	16
9	Integrated Library Software	2	18
10	Conversion of Library collection	1	19
	TOTAL		19

Phase of Development at Nolan's Six Stage Growth Model = $19/50 \times 6 = 2.28$ i.e. In the begining of Phase -III

IX. Libraries of some Government Funding Organizations in the field of S&T.

1. **University Grant Commission**, Bahadur Shah Zafar Marg, New Delhi 110002; tel. 3319628; f. 195d3 to promote and co-ordinate university education; to determine and maintain the standards of teaching, examination and research in universities; may allocate grants to universities and colleges for these purposes; library of 41,850 vols; receives 50 journals.

Table : Library Resources Data Matrix of UGC

S.No	Variable	Matrix	Cumulative total
1	Librarian's Status	3	3
2	Central Computing facilities	4	7
3	Library Computer Application Division	3	10
4	Access to Electronic Journals	-	10
5	CD-ROM Data bases (ERL Technology):	1	11
6	Bar Coding Technology	-	-
7	Division wise Library Computerization	2	13
8	Library OPAC	1	14
9	Integrated Library Software	2	16
10	Conversion of Library collection	1	17
	TOTAL		19

Phase of Development of IT in its Library at Nolan's Six Stage Growth Model =

$17/50 \times 6 = 2.04$ (Phase -II)

2. All India Council of Technical Education (AICTE), IG Stadium, New Delhi-2

The AICTE was constituted in 1945 as an advisory body in all matters relating to technical education. Even though it had no statutory powers, it played a very important role in the development of technical education in the country. It had four regional committees with offices at Chennai, Mumbai and Kanpur and Calcutta. All the new schemes and proposal for starting new institutions / programmes were approved by the corresponding Regional Committee and subsequently vetted by the Council. There was a large-scale expansion of technical education in the late fifties and early sixties and again in the eighties. While the expansion in the fifties was done with the approval of the AICTE and government of India, The expansion in the eighties was localised mostly in the four states of Karnataka, Maharashtra, Tamil Nadu and Andhra Pradesh and was primarily in the self-financing sector without the approval of the AICTE and Government of India.

The Council is a 51 member body consisting of Chairman, Vice-Chairman and Member-Secretary, all appointed by the Central Government on full-time basis; and in addition, representation from Central and State Governments, Parliament, industry and Commerce, Central Advisory Board of Education (CABE), Association of Indian Universities (AIU), Indian Society for Technical Education (ISTE), Council of IITs, Pharmacy Council of India, Council, Professional Bodies in the field of technical and management education. It also consists of the chairmen of all India Boards of Studies and Regional Committees of the Council, Chairman, UGC; Director, Institute of Applied Manpower Research (IAMR); director Generals of Indian Council of Agricultural Research (ICAR); and Council of Scientific and Industrial Research (CSIR); as its ex-officio members.

Table : Library Resources Data Matrix of AICTE

S.No	Variable	Matrix	Cumulative total
1	Librarian's Status	3	3
2	Central Computing facilities	1	4
3	Library Computer Application Division	2	5
4	Access to Electronic Journals	-	10
5	CD-ROM Data bases (ERL Technology):	1	11
6	Bar Coding Technology	-	11
7	Division wise Library Computerization	1	12
8	Library OPAC	-	-
9	Integrated Library Software	-	-
10	Conversion of Library collection	1	13
	TOTAL		19

Phase of Development of IT in AICTE Library at Nolan's Six Stage Growth Model =

$$13/50 \times 6 = 1.56 \text{ (Phase - I)}$$

Group -X. DRDO Institutions in the field of S&T.

The Ministry of Defence has a number of R&D laboratories, establishments, training institutions, design centers, production units, fabrication and maintenance workshops, etc. For meeting the various technical and operational requirements of the armed forces and other agencies. The department of defence has a number of scientific and technical personal in its Army, Navy, & Airforce as well as training & Research establishments. Defence Research and Development Organization (DRDO) has about 45 Laboratories located all over India which carry advanced level R&D work in the field of Defence interest ranging from Armaments, combat, Vehicles, Radars, Missiles, Materials, to food, clothing, high altitudes, agriculture, medicine, and so on. Out of the 45 laboratories, 9 laboratories and one Documentation center i.e. DESIDOC is situated in Delhi. DRDO & all its 9 laboratories

are having their libraries. The Data matrix at wt.50 and value of Nolan's six stage growth Model is given below in the table:

Table: Nolan's six stage growth Model value of the DRDO & all its laboratories

SN	Name of the S&T organization	Data Matrix Wt50	Nolan's six stage Growth Model value
1	Center for Environment and Explosive Safety , Delhi	18	2.16
2	Defence Institute of Fire Research, Prolyn Road, Delhi,	16	1.92
3	Defence Institute of Physiology and Allied Science Delhi	19	2.28
4	Defence Institute of Psychological Research, Prolyn Road, Delhi.	15	1.18
5	Defence Science Centre, Metcalfe House, Delhi-54	19	2.28
6	Defence Scientific Information & Doc. Centre (DESIDOC) Delhi.	42	5.04
7	Defence Terrain Research Laboratory, Metcalfe House,Delhi-54.	15	1.18
7	Institute of Nuclear Medicine & Allied Science, Delhi-.	18	2.16
8	Institute of Systems Studies & Analysis, Delhi.	15	1.8
9	Scientific Analysis Group, Metcalfe House, Delhi-54.	15	1.8
10	Solid State Physics Laboratory, Lucknow Road,Delhi.54.	24	2.88

All the 9 laboratories are having their libraries and documentation units. The application of Information Technology (IT) in DESIDO, New Delhi at Nolan's six stage growth model is 5.04 i.e in stage V. SSPL = 2.88 i.e. Near Phase III. Other labs are almost in stage I & II.

XI. Council of Scientific and industrial Research (CSIR):

Rafi Marg, New Delhi; tel 37111251; fax 3714788; e-mail csirhq@sirnetd.ernet.in; internet

www.csir.res.in; f.1942;

CSIR library is having a collection of more than 20,000 vol. There are more than 41 national CSIR research laboratories in India. 7 research Laboratories are available in Delhi. The CSIR & all its laboratories are having their libraries. The Data matrix at wt.50 and value of Nolan's six stage growth Model of libraries of CSIR Hqs. & their labs is given below in the table:

Table: Nolan's six stage growth Model value of the CSIR & all its laboratories

S.N.	Name of the S&T organization	Data Matrix Wt50	Nolan's six stage Growth Model value
1	Council of Scientific & Industrial Research (CSIR), Rafi-Marg, New Delhi.	14	1.68
2	Central Road Research Instt. Delhi	19	2.28
3	Centre for Biochemical Technology, Delhi	17	2.28
4	INSDOC, 14, Satsang Vihar Marg, Delhi	38	4.56
5	National Institute of Science Communication, Delhi.	18	2.16
6	National Institute of Science,Technology & Development Studies, Delhi	17	2.04
7	National Physical Laboratory, Delhi	34	4.08

All the 7 laboratories are having their libraries and documentation units. Indian National Scientific Documentation Center described in Group -II above is also comes under CSIR. The application of Information Technology (IT) in INSDOC , New Delhi at Nolan's six stage growth model is 4.56 i.e near stage V. The National Physical Laboratory: Hillside Rd., New Delhi 110012 is also one of the prestigious Laboratory of CSIR which has a well equipped Library containing a

collection of more than 109,000 Vols. At Nolan's six stage IT growth model the library of NPL is 4.88 i.e. Near Phase IV. Other labs are almost in stage I & II.

XII. Indian Council of Agricultural Research (ICAR): Krishi Bhawan, Dr. Rajendra Prasad Rd. New Delhi 110001; TEL. 388991; FAX 387293.

Founded in 1929 to promote agricultural and animal husbandry research in conjunction with State Governments, Central and State Research Institutions, etc. There are more than 83 national CSIR research laboratories in India. The ICAR & all its laboratories are having their libraries. The Data matrix at wt.50 and value of Nolan's six stage growth Model is given below in the table:

Table: Nolan's six stage growth Model value of the ICAR & all its laboratories

S.N.	Name of the S&T organization	Data Matrix Wt50	Nolan's six stage Growth Model value
1	ICAR head quarter Library	13	1.56
2	IARI, Pusa Road, New Delhi-12	34	4.08
3	Indian Agricultural Statistics Research Institute, Delhi	26	3.12
4	National Bureau of Plant Genetic Resources, New Delhi-12	11	1.32
5	National Centre for Agricultural Economics & Policy Research, Delhi	13	1.56
6	National Centre for Integrated Pest Management, New Delhi	12	1.44

Publishes Indian Journal of Agricultural Sciences, Indian Journal of Animal Sciences, Indian Forming, Kheti (all monthly), Indian Journal of Fisheries, Indian Journal of Agricultural Engineering, Indian Horticulture, Phal-Phool, Krishi Chayanika (all quarterly)

The ICAR head quarter & all its 5 laboratories are having their libraries and documentation units. Indian Agriculture Research Institute (IARI) as described in Group -VI above is also comes under CSIR. It is a deemed university and its library is considered as National Library of Agriculture in India.

The application of Information Technology (IT) in IARI, New Delhi at Nolan's six stage growth model is 4.08 i.e above Growth stage IV. The Indian Agricultural Statistics Research Institute, Delhi (IASRI), Hillside Rd., New Delhi 110012 is also one of the prestigious Laboratory of ICAR which has a well equipped Library containing a collection of more than 109,000 Vols. Its Library is also contributing a lot in AGRIS, and working as clearing and Nodal point for AGRIS. At Nolan's six stage IT growth model the library of IASRI is 3.15 which above Phase III. Other labs are almost in stage I.

Group -XIII. Indian Council of Medical Research (ICMR) & its Institutions:

1. Indian Council of Medical Research (ICMR), Medical Enclave, Ansari Nagar, POB 4911, New Delhi 1029 TEL.667136 FAX 6868662; F. 1911.

Promotes, Coordinates and funds for medical research. 28 ICMR Research Institutions and six Regional Medical Research Centres available in India out of which following 4 research Institutes are available in Delhi. The ICMR & all its 4 laboratories are having their libraries. The Data matrix at wt.50 and value of Nolan's six stage growth Model is given below in the table:

Table: Nolan's six stage growth Model value of the ICMR & all its laboratories

S.N.	Name of the S&T organization	Data Matrix Wt50	Nolan's six stage Growth Model value
1	Indian Council of Medical Research	15	1.8
2	Institute for Research in Medical Statistics, Delhi	13	1.56
3	Institute of Cytology & Preventive Oncology, Delhi.	11	1.32
4	Institute of Pathology Safdarjung Hospital Campus, Delhi	12	1.44
5	Malaria Research Centre, 22, Sham Nath Marg, Delhi	13	1.56

The collection of ICMR Library is more than 15,000 vls; publs Indian Journal of Medical Research (monthly, with supplements) ICMR Bulletin (montly), Indian Journal of Malariaiology (quarterly), Annual Reports of Council.

The ICMR head quarter & all its 4 laboratories are having their libraries and documentation units. At Nolan's six stage IT growth model of all these libraries is 1.53 which is in near Phase I.

Group -XIV. Libraries of other Institutes of S&T.

1. National Medical Library, New Delhi (NML)

In the begning the library was known as Directorate of General of Health Services (DGHS) Library. For the purpose to support medical profesionals in the country, it was declared as Central Medical Library in 1961. In April, 1966 it was renamed as National Medical Library (NML). It functions under the administrative control of Directrorate General of Health Services. It has 3.6 lakh volumes of books, reports, bound volumes of journals. It subscribes to more than 2000 titles of Current journals annually. NML is also the National Focal Points of HELLIS Network set up by WHO in Southeast Asia in 1982.

Table : Library Resources Data Matrix of NML

S.No	Variable	Matrix	Cumulative total
1	Librarian's Status	4	4
2	Central Computing facilities	3	7
3	Library Computer Application Division	3	10
4	Access to Electronic Journals	4	14
5	CD-ROM Data bases (ERL Technology):	1	15
6	Bar Coding Technology	2	17
7	Division wise Library Computerization	2	19
8	Library OPAC	1	20
9	Integrated Library Software	3	23
10	Conversion of Library collection	2	25
	TOTAL		25

Phase of Development of IT in NML Library at Nolan's Six Stage Growth Model =

$$25/50 \times 6 = 3 \text{ (Phase -III)}$$

2. National Institute of Health and Family Welfare (NIHFW)

New Mehrauli Rd., Munirka, New Delhi 110067;

Tel 6850057; fax 6851623; f.1977; in-service training, MD course in community health administration, biomedical research, research and consultancy; regional center for health management; documentation and reprographic services; specialized library of 35,000 vols;

Table : Library Resources Data Matrix of NIHFW Library Documentation Center.

S.No	Variable	Matrix	Cumulative total
1	Librarian's Status	3	3
2	Central Computing facilities	4	7
3	Library Computer Application Division	3	10
4	Access to Electronic Journals	1	11
5	CD-ROM Data bases (ERL Technology):	1	12
6	Bar Coding Technology	1	13
7	Division wise Library Computerization	2	15
8	Library OPAC	1	16
9	Integrated Library Software	3	19
10	Conversion of Library collection	1	20
	TOTAL		20

Phase of Development of IT in its Library at Nolan's Six Stage Growth Model =

20/50 x 6 = 2.40 (Above Phase -II)

Group -XV. Libraries of Academy, Associations etc.

1. **Association of Indian Universities**, AIU House, 16 Kotla Marg, New Delhi 110002. Tel.(11) 3236105; fax (11) 3232131: email aiu@del2.vsnl.net.in: internet www.aiuweb.org; f.1925; facilitates exchange of information between universities, organizes meetings, conference of vice-chancellors, inter-university youth festivals and sports events, researches into contemporary problems and issue relating to higher education and overseas degree equivalence, liaises with foreign universities; 256 mem. Univs; library of 30,000 vols, 130 periodicals.

Table : Library Resources Data Matrix of AIU Library.

S.No	Variable	Matrix	Cumulative total
1	Librarian's Status	2	2
2	Central Computing facilities	1	3
3	Library Computer Application Division	2	5
4	Access to Electronic Journals	1	6
5	CD-ROM Data bases (ERL Technology):	1	7
6	Bar Coding Technology	1	8
7	Division wise Library Computerization	2	10
8	Library OPAC	1	11
9	Integrated Library Software	3	14
10	Conversion of Library collection	1	15
	TOTAL		15

Phase of Development of IT in its Library at Nolan's Six Stage Growth Model =

$$15/50 \times 6 = 1.8 \text{ (Phase - I)}$$

2. Indian National Science Academy (formerly National Institute of Sciences of India), Bahadur shah Zafar Marg, New Delhi 110002 Bahadur Shah Zafar Marg, New Delhi 110002; tel.(11) 3231038; fax(11) 3235648; e-mail insa@giasdlol.vsnl.in; f.1935 to promote scientific knowledge, co-ordination between scientific bodies, and safeguard the interest of scientists in india; adhering organization of ICSU; 676 Fellows, 104 Foreign Fellows; library of 21,000 vols; Presss.

Table : Library Resources Data Matrix of INSA Library.

S.No	Variable	Matrix	Cumulative total
1	Librarian's Status	4	4
2	Central Computing facilities	1	5
3	Library Computer Application Division	2	7
4	Access to Electronic Journals	3	10
5	CD-ROM Data bases (ERL Technology):	2	12
6	Bar Coding Technology	1	13
7	Division wise Library Computerization	2	15
8	Library OPAC	3	18
9	Integrated Library Software	3	21
10	Conversion of Library collection	1	22
	TOTAL		22

Phase of Development of IT in INSA Library at Nolan's Six Stage Growth Model =

$22/50 \times 6 = 2.64$ (Advance stage of Phase - II)

6.4. GENERAL INFORMATION ABOUT LIBRARY SYSTEMS

1. Library Systems: General Information :

Name of Organization	Collection	Users	Staff	Computerization (Nolan 6 Stages Scale)
<u>Group -I</u>				
1. WHO	70,000	All over India	20	II
2. UNESCO (S&T)	30,000		11	II
<u>Group-II</u>				
1. INSDOC	2 Lacs	-do-	250	IV
2. DESIDOC	1.5 Lacs		113	V
<u>Group-III</u>				
1. AIIMS	1.30 Lacs	3000	26	IV
2. IIT, DELHI.	3 Lacs	6500	37	V
<u>Group- IV</u>				
1. TERI	20,000	200	10	III
2. SPA	25000	300	11	II
<u>Group -V</u>				
1. DU	13 Lacs	10,000	400	I
2. JNU	5 Lacs	6000	120	II
<u>Group-VI</u>				
1. HAMDARD	1.5 Lacs	400	20	I
2. IARI	6 Lacs	6000	39	III
<u>Group -VII</u>				
1. GGS & IP	15000	300	7	II
2. 27 Affiliated Institutes	Avaerage 7000	Average 00	Average 2	Average I
<u>Group -VIII</u>				
1. IGNOU	68000	500	30	III
2. JAMIAM	2 Lacs	600	23	I

<u>Group-IX</u>				
1. UGC	60,000	200	5	I
2. AICTE	20,000	100	3	I
<u>Group-X</u>				
1. DRDO	Library	400	5	I. (Desidoc is in Phase IV)
2. 10 DRDO Laboratories located in Delhi	Average 6000	300	7	II
<u>Group-XI</u>				
1. CSIR	20,000	300	3	I
2. 7 CSIR Laboratories	Average 7,000	Average 600	Average 6	Average I. INSDOC & NPL Library also comes under CSIR. Their Growth stage is V & IV respectively.
<u>Group -XII</u>				
1. ICAR	30,000	300	4	I
2. 4 ICAR Laboratories	Average 6,000	400	3	I.(This is other than IARI & IASRI).
<u>Group-XIII</u>				
1. ICMR	15000	500	7	II
2. 3 ICMR Laboratories.	Avaerage 7000	Average 300	Average 2	Average I
<u>Group -XIV</u>				
1. NML	3.6 Lacs	All Over India	31	II
2. NIHFW	2 Lacs	600	23	I
<u>GROUP - XV</u>				
1. AIU	40,000	300	4	II
2. INSA	1 lAC	400	9	III
Total = 72				

Table. Pay Scale- wise (Basic of the Pay scale in Rupees) Librarian's Profile (Library managers)) of the respondants.

Name of Organization	Rs. 16,400 - and above	Rs.14,300	Rs.12,000	Rs. 10,000	Rs.8000 Or less
<u>Group -I</u>					
1. WHO	1			2	1
2.UNESCO (S&T)		1		1	1
<u>Group-II</u>					
1. INSDOC	1	1			20
2.DESIDOC	1	1			15
<u>Group-III</u>					
1. AIIMS	1				1
2. IIT, DELHI.		4			1
<u>Group- IV</u>					
1. TERI				1	1
2. SPA				1	1
<u>Group -V</u>					
1. DU	1		1		12
2. JNU	1		1		5
<u>Group -VI</u>					
1. HAMDARD				1	3
2. IARI			1	1	3
<u>Group -VII</u>					
1. GGS & IP	1				2
2. 27 Affiliated Institutes					27
<u>Group -VIII</u>					
1. IGNOU	1				2
2. JAMIAM			1		2

<u>Group-IX</u>		1			1
1. UGC					1
2. AICTE					1
<u>Group-X</u>					
1. DRDO					1
2. 10 DRDO Laboratories located in Delhi					8
<u>Group-XI</u>					
1. CSIR					1
2. 7 CSIR Laboratories					6
<u>Group -XII</u>					
1. ICAR					1
2. 4 ICAR Laboratories					4
<u>Group-XIII</u>					
1. ICMR					1
2. 3 ICMR Laboratories.					3
<u>Group -XIV</u>					
1. NML		1		1	6
2. NIHFW				1	1
<u>GROUP - XV</u>					
1. AIU					1
2. INSA			1		
Total = 72	8	9	5	9	132

CHAPTER - 7

STUDY OF ORGANIZATIONAL CULTURE

(Managerial attitudes, perceptions, values etc.)

(Analysis of Data)

The chapter reports the statistical analysis of the data of the Questionnaires " Study of Organizational Culture". It reports the results of the 21 statements related to the managerial attitude & perception. The mean score, and other statistical analysis were made to investigate the CO-relation Matrix. The testing of Hypothesis was also made using CO- relation matrix , Chi -Squire Test (Pearson's) and other statistical calculations. On the basis of analysis of the data, the perceptual factors responsible for Change in the given S&T libraries were investigated.

7.1. PROFILE OF THE RESPONDENTS

The perceptual data (Managerial Attitude. Perceptions, culture, values etc) was collected from a group of 163 Library managers (Librarians, Deputy Librarians, Assistant Librarians, Library Sections heads) of 72 S&T organizations. They gave their feed back for importance and utility of Information Technology (IT) in the management of their Library in changing environment. The Data was collected using the following two instruments:

- Questionnaire for Managerial attitudes, perceptions, values etc.
- Questionnaire for SWOT analysis

Both the instruments were designed for the collection of data on the managerial attitudes and perceptions related aspects. In the study, the Universe Sample is adopted. The Universities Handbook, 28th editions (January 2000), & Directory of R&D Institutions

(1999) published by DST was made the base of Selection of Sample. In total, the study of 72 Libraries / Documentation centres of different type of organizations, as given below in table 6.1 was undertaken:

Table. 7. 1

S.No.	Name of the Library / Documentation Centers undertaken in the study.	Total
1	University Institutions	11
2	Institutions affiliated with GGS Indraprastha University, Delhi	27
3	Association of Indian Universities	1
4	INSA	1
5	UNESCO (S&T Documentation Center), Vasant Vihar, N. Delhi	1
6	WHO	1
7	UGC	1
8	AICTE	1
9	CSIR Laboratories	7
10	ICMR Laboratories	3
11	DRDO Laboratories	10
12	ICAR Laboratories	4
13	Defence Science Information and Documentation Center (DESIDOC)	1
14	Indian National Scientific Documentation Centers (INSDOC)	1
15	National Medical Library (NML)	1
15	NIHFW	1
	Total	72

In the study the all the important laboratories (about 24) i.e 5 CSIR Labs, 3 ICMR labs, 12 DRDO Labs, 4 ICAR Labs are undertaken in the study. The use of Information Technology (IT) in INSDOC, DESIDOC, NML, International organizations, Associations,

Science Academies, University affiliated academic institutions, and few S&T Departments / Centers of only two universities etc are also undertaken in the study. Out of the 13 University Institutes of Delhi state, only 11 related to S&T are undertaken in the study. For analysis purpose, in place of complete name of the Organization / Institutes, only their abbreviations, is used through out the study.

The data was collected about the behavior, attitudes and perception , technical quality of system, performance, situational and personal factors, and decision style as the main determinants of Information Technology use. In the Information Technology the Automation, Networking, use of Internet, Barcodings, Electronic Journals, Digitizations are taken as the main determinant of IT use.

The data was also collected to test the relationship of personal characteristics of these managers, such as Sex, age educational qualification, knowledge of computer, designation, involvement in computerization, and pay scale of the respondents of the given libraries with their perception towards Information Technology Use in library management. The characteristics of the respondents are given as below:

Table.7.2 MALE / FEMALE

Variable	Value	Frequency	Percent	Valid percent	Cumulative Percent
Male	1	108	66.26	66.26	66.26
Female	2	55	33.74	33.74	100
Total		163	100	100	100

Valid Cases 163 Missing cases 0

Table. 7.3 AGE

Variable	Value	Frequency	Percent	Valid percent	Cumulative Percent
Age<40	1	104	63.80	63.80	63.80
Age > 40	2	59	36.20	36.20	100
No response	0	0	0	missing	
Total		163	100	100	100

Valid cases 163 Missing cases = 0

Table. 7.4 . EDUCATIONAL QUALIFICATION:

Variable	Value	Frequency	Percent	Valid Percent	Cumulative Percent
Bachelors	1	43	26.38	26.38	26.38
Masters	2	102	62.58	62.58	88.96
Associate	3	5	3.07	3.07	92.03
M.Phil	4	1	0.61	0.61	92.64
Ph.D.	5	12	7.36	7.36	100
Total		163	100	100	

Valid cases 163 Missing cases 0 = 0 .0%

Table. 7.5 DESIGNATION:

Variable	Value	Frequency	Percent	Valid Percent	Cumulative Percent
Section Head (Professional Assistants)	1	89	54.60	54.94	54.94
Asistant Librarian (Pay scale Rs. 10000 & Rs. 8000 both)	2	51	31.29	31.98	86.42
Dy.Lib(Pay Scale Rs. 14300 & Rs. 12000 both)	3	14	8.8.58	8.64	95.06
Librarian	4	8	4.90	4.94	100
No response	5	1	0.61	Missing	
Total		163			

Valid cases = 162 Missing cases = 1 = 0.61%

Table. 7.6. KNOWLEDGE OF COMPUTERS

Variable	Value	Frequency	Percent	Valid percent	Cumulative
Yes	1	121	74.23	74.23	74.23
No	2	42	25.77	25.77	100

Valid cases 163 Missing cases = 0 = 0%

Table. 7.7 INVOLVEMENT

Variable	Value	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	1	115	70.6	70.6	70.6
No.	2	98	29.4	29.4	100
	Total	163	100	100	

Valid cases 163 Missing cases 0

7.2: ANALYSIS OF STATEMENTS

To study the Managerial attitudes, perceptions, values etc, data related to the use of Information Technology (IT) in S&T libraries a questionnaire containing the demographic data of Library managers and also twenty-one statements were designed at conceptual level. These statements cover a broad range of issues related to the various stages of development of a IT -based Library systems. At the individual level of analysis these include awareness, belief, knowledge and skill of the respondents as factors responsible for IT applications in S&T libraries. At the external environmental or institutional level of analysis this includes the support provided by Top Management, Governmental Agencies, changes in the Technological, Organizational, and Professional spheres of activity. The structured questions were designed. All the questionnaire were collected personally from the library managers of all the 77 libraries under study.

Statement 1: 'There is an emerging trend of literature related to the Information technologies (IT) in S&T libraries.

The statement seeks to test the extent of awareness and interest of the respondents about the emerging trends of literature related to the IT - based systems in the given S&T libraries under study. Out of the 163 respondants, 1 (0.61 %) not responded. Cumulatively an overwhelming majority (70.29 %) of our sample were of the opinion that there is an increasing trend of IT & computer-based systems in libraries. This includes the 18.45 % respondents who strongly perceive so. Significantly less than 14 % of this sample indicated disagreement to the above statement, while nearly 16 % indicated ambivalence. The mean score of perception for this statement is 3.20 which lies on the scale near 'agree'.

Table. ST1

Label	Class Interval	Mid Value (x)	Frequency (f)	Percent	Valid percent	Cumulative Percent	f.x
Strongly disagree	0-1	0.5	8	4.90	4.91	4.91	4.0
Disagree	1-2	1.5	14	8.59	8.69	13.50	21.0
Neither agree nor disagree	2-3	2.5	26	16.00	16.21	29.71	65.0
Agree	3-4	3.5	84	51.50	51.84	81.55	294.0
Strongly agree	4-5	4.5	30	18.40	18.45	100	135.0
No response			1	0.61	Missing		
	Total		163	100	100		$\sum fx$ = 519

Valid case = 162

Missing cases = 1, 0.61 %

Mean score = $\sum fx / \sum f = 519 / 162 = 3.20$

Statement 2: " Use of IT in libraries provides timely and cost effective services to the Library Users."

The statement seeks to test the perception of the respondents about the Usefulness of the IT - based systems in the given S&T libraries under study. Out of the 163 respondants, 6 (3.7 %) not responded (Missing). Cumulatively 73.25 % of our sample were of the opinion that use of IT in libraries provides timely and cost effective services to the Library users. This includes the 14.65 % respondents who strongly perceive so. Significantly less than 9% of this sample indicated disagreement to the above statement, while nearly 17.83% indicated ambivalence. The mean score of perception for this statement is 3.28 which lies on the scale Agree.

Table. ST2.

Label	Class Interval	Mid Value (x)	Frequency (f)	Percent	Valid percent	Cumulative Percent	f.x
Strongly disagree	0-1	0.5	0	0	0	0	0
Disagree	1-2	1.5	14	8.59	8.92	8.92	21
Neither agree nor disagree	2-3	2.5	28	17.18	17.83	26.75	70
Agree	3-4	3.5	92	56.44	58.60	85.35	322
Strongly agree	4-5	4.5	23	14.11	14.65	100	103.5
No response			6	3.68	Missing		
	Total		163	100	100		$\Sigma fx = 516.5$

Valid case = 157

Missing cases = 6, = 3.68 %

Mean score = $\Sigma fx / \Sigma f = 516.5 / 157 = 3.28$

Statement 3: "Various Professional bodies, Universities, Research institutions, Govt.

Organization etc. are helping in the use of IT in libraries."

The statement seeks to test the perception of the respondents about organizational encouragement for use of IT in S&T Libraries of Delhi region. All the 163 respondents responded the statement. Cumulatively about 73.63% of our sample were in favour of this statement, including 16.56% who strongly agree to it. Significantly more than 12.26 % indicated disagreement to this statement, while more than 14.11% indicated ambivalence. The mean score of perception of this statement is 3.16 which indicates that the respondents are agree to this statement.

Table. ST3.

Label	Class Interval	Mid Value (x)	Frequency (f)	Percent	Valid percent	Cumulative Percent	f.x
Strongly disagree	0-1	0.5	10	6.13	6.13	6.13	5
Disagree	1-2	1.5	10	6.13	6.13	12.26	5
Neither agree nor disagree	2-3	2.5	23	14.11	14.11	26.37	57.5
Agree	3-4	3.5	93	57.07	57.07	83.44	325.5
Strongly agree	4-5	4.5	27	16.56	16.56	100	121.5
No response			0	-	Missing		
	Total		163	100	100		Σfx $=514.5$

Valid Case = 163

Missing Cases = 0

Mean Score = $\Sigma fx / \Sigma f = 514.5 / 163 = 3.16$

Statement 4: ' In the near future the S&T libraries will be converted to the digital libraries.

The statement seeks to test the belief of the respondents that in the near future the S&T libraries will be converted to the digital libraries. Out of the 163 respondents, 1 (0.61%) not responded (Missing) the statement. Cumulatively about 60 % in favour of this statement including 16 % who strongly believe that in the near future the S&T libraries will IT based. Significantly 13.60% indicated disagreement to it while more than a quarter (27.20%) indicated ambivalence. The mean score of perception for this statement is 3.10 which lies on the scale " agree".

Table : ST4

Label	Class Interval	Mid Value (x)	Frequency (f)	Percent	Valid percent	Cumulative Percent	f.x
Strongly disagree	0-1	0.5	2	1.2	1.21	1.21	1
Disagree	1-2	1.5	20	12.3	12.39	13.60	30
Neither agree nor disagree	2-3	2.5	44	27.0	27.20	40.60	110
Agree	3-4	3.5	70	42.9	43.20	84.00	245
Strongly agree	4-5	4.5	26	16.0	16.00	100	117
No response			1	0.6	Missing		
	Total		163	100	100		Σfx =503

Valid Case = 162

Missing Cases = 1 =0.6 %

Mean score = $\Sigma fx / \Sigma f = 503 / 162 = 3.10$

Statement 5: "The Use of IT willl essentially be needed by the S & T libraries in near future."

This statement again seeks to test the belief of the respondents that the Use of IT willl essentially be needed by the S & T libraries in near future. Out of the 163 respondants, 1 (0.61 %) not responded (Missing) the statement. Cumulatively more than half of the population (55.6%) of our sample supported this statement, including more than 21.6 % who strongly agree to it. Significantly about a quarter indicated any disagreement to it, while the same number i.e a quarter indicated ambivalence. The mean score of perception for this statement is 3.03 which indicate that the sample population are agree to it.

Table. ST5

Label	Class Interval	Mid Value (x)	Frequency (f)	Percent	Valid percent	Cumulative Percent	f.x
Strongly disagree	0-1	0.5	7	4.3	4.3	4.3	3.5
Disagree	1-2	1.5	24	14.7	14.8	19.1	36
Neither agree nor disagree	2-3	2.5	41	25.2	25.3	44.4	102.5
Agree	3-4	3.5	55	33.7	34.0	78.4	192.5
Strongly agree	4-5	4.5	35	21.5	21.6	100	157.5
No response			1	0.6	Missing		
	Total		163	100	100		$\Sigma fx = 492$

Valid case = 162

Missing cases = 1 = 0.6 %

Mean score = $\Sigma fx / \Sigma f = 492 / 162 = 3.03$

Statement 6: " S & T Libraries are well versed with the use of IT based management techniques.

This statement seeks to test the perception of the respondents that S & T Libraries are well versed with the use of IT based management techniques. Out of the 163 respondents, 6 (3.7 %) not responded (Missing) the statement. Cumulatively more than 30 % of the population of this sample were not sure about this statement and indicated ambivalence. Significantly more than 21 % of this indicated any disagreement to it, while 47.7 % supported this statement. The mean score of perception for this statement is 2.85 which is on the scale "neither agree nor disagree".

Table . ST6.

Label	Class Interval	Mid Value (x)	Frequency (f)	Percent	Valid percent	Cumulative Percent	$f.x$
Strongly disagree	0-1	0.5	8	4.9	5.1	5.1.1	4
Disagree	1-2	1.5	26	15.9	16.6	21.7	39
Neither agree nor disagree	2-3	2.5	48	29.4	30.6	52.3	120.0
Agree	3-4	3.5	52	31.9	33.1	85.4	182.0
Strongly agree	4-5	4.5	23	14.2	14.6	100	103.5
No response			6	3.7	Missing		
	Total		163	100	100		Σfx =448.5

Valid case = 157

Missing cases = 6 =3.7 %

Mean score = $\Sigma fx / \Sigma f = 448.5 / 157 = 2.85$

Statement 7: "Most of the S & T library managers are having working knowledge of IT and Internet..

This statement seeks to test the perception of the respondents about the working knowledge of library managers i.e. Most of the S & T library managers are having working knowledge of IT and Internet. All the 163 respondents responded the statement. Cumulatively 46.64 % of our sample supported this statement, this includes more than 14 % who strongly supported to this statement. Significantly about a quarter indicated their disagreement to it, while more than 28.83 % indicated ambivalence. The mean score of perception for this statement is 2.80 which lies just above the scale "disagree".

Table. ST7

Label	Class Interval	Mid Value (x)	Frequency (f)	Percent	Valid percent	Cumulative Percent	f.x
Strongly disagree	0-1	0.5	10	6.13	6.13	6.13	5
Disagree	1-2	1.5	30	18.40	18.40	24.53	45
Neither agree nor disagree	2-3	2.5	47	28.83	28.83	53.36	117.5
Agree	3-4	3.5	53	32.52	32.52	85.88	185.5
Strongly agree	4-5	4.5	23	14.12	14.12	100	103.5
No response			0	Nil	Nil		
	Total		163	100	100		$\Sigma fx = 456.5$

Valid case = 163

Missing cases = 0

Mean score = $\Sigma fx / \Sigma f = 456 / 163 = 2.80$

Statement 8: "S&T Librarians need not require any rigorous training in computerization."

This statement seeks to test the perception of the respondents about the necessity of the training of library managers for S&T libraries. The statement " S&T Librarians need not require any rigorous training in computerization.". Out of the 163 respondents, 2 (1.23 %) not responded (Missing) the statement. Cumulatively more than 27 % of our sample were in favor of this statement. Significantly about 37 % of this indicated their disagreement to it, while more than 34 % indicated ambivalence. The mean score of perception for this statement is 2.27 % which lies slightly near the scale" disagree".

Table. ST8

Label	Class Interval	Mid Value (x)	Frequency (f)	Percent	Valid percent	Cumulative Percent	f.x
Strongly disagree	0-1	0.5	23	14.11	14.29	14.29	11.5
Disagree	1-2	1.5	38	23.31	23.60	37.89	57.0
Neither agree nor disagree	2-3	2.5	55	33.74	34.16	72.05	137.5
Agree	3-4	3.5	43	26.38	26.71	98.76	150.5
Strongly agree	4-5	4.5	2	1.23	1.23	100	9.0
No response			2	1.23	Missing		
	Total		163	100	100		$\sum fx = 365.5$

Valid Cases = 161

Missing Cases = 2 = 1.23 %

Mean score = $\sum fx / \sum f = 365.5 / 161 = 2.27$

Statement 9: "Top management are keen in computerization."

This statement seeks to test the perception of the respondents about the interest of the top management of the organization in IT based libraries. All the 163 respondents responded to the statement. Cumulatively more than 80.37 % of our sample supported this statement. Significantly about 11.65% of the indicated any disagreement to it, while less than 8% indicated ambivalence. The mean score of perception for this statement is 3.20 which lies near the scale "Agree."

Table. ST.9

Label	Class Interval	Mid Value (x)	Frequency (f)	Percent	Valid percent	Cumulative Percent	f.x
Strongly disagree	0-1	0.5	9	5.52	5.52	5.52	4.5
Disagree	1-2	1.5	10	6.13	6.13	11.65	15
Neither agree nor disagree	2-3	2.5	13	7.98	7.98	19.63	32.5
Agree	3-4	3.5	120	73.62	73.62	93.25	420
Strongly agree	4-5	4.5	11	6.75	7.75	100	49.5
No response			Nil	Nil	Nil		
	Total		163	100	100		Σfx = 521.5

Valid Cases = 163

Missing Cases = 0

Mean Score = $\Sigma fx / \Sigma f = 521.5 / 163 = 3.20$

Statement 10: "Funds for computerization are no limitation."

This statement seeks to test the perception of the respondents about the Financial support of the organization in IT based S&T libraries. Out of the 163 respondents, 4 (2.45 %) not responded (Missing) the statement. Cumulatively more than 30% of our sample were neither agree nor disagree to this statement. Out of the remaining 70% of its population 36.48 % half of this were in favour of it and 32.7 % of it show their disagreement to it. The mean score of perception for this statement is 2.51 which lies near the scale "neither agree nor disagree."

Table. ST 10.

Label	Class Interval	Mid Value (x)	Frequency (f)	Percent	Valid percent	Cumulative Percent	f.x
Strongly disagree	0-1	0.5	17	10.43	10.69	10.69	8.5
Disagree	1-2	1.5	35	21.47	22.01	32.7	52.5
Neither agree nor disagree	2-3	2.5	49	30.06	30.82	63.52	122.5
Agree	3-4	3.5	45	27.61	28.30	91.82	157.5
Strongly agree	4-5	4.5	13	7.98	8.18	100	58.3
No response			4	2.45	Missing		
	Total		163	100	100		$\sum fx$ =399.3

Valid case = 159

Missing cases = 4 = 2.45 %

Mean score = $\sum fx / \sum f = 399.3 / 159 = 2.51$

Statement 11: "Librarians are afraid of computerization."

This statement seeks to test the perception of the respondents about their fear / how they feel about IT - based libraries. Out of the 163 respondents, 4 (2.45 %) not responded (Missing) the statement. Cumulatively majority (62.26 %) of our sample agreed to this statement including 18.24 % of the sample strongly agreed to it. More than 13 % disagree to this statement. Significantly about a quarter of this sample indicated ambivalence. . The mean score of perception for this statement is 3.12 which lies on the scale "Agree."

Table. ST 11

Label	Class Interval	Mid Value (x)	Frequency (f)	Percent	Valid percent	Cumulative Percent	f.x
Strongly disagree	0-1	0.5	9	5.53	5.66	5.66	4.5
Disagree	1-2	1.5	12	7.36	7.55	13.21	18
Neither agree nor disagree	2-3	2.5	39	23.93	24.53	37.74	97.5
Agree	3-4	3.5	70	42.94	44.02	81.76	245
Strongly agree	4-5	4.5	29	17.79	18.24	100	130.5
No response			4	2.45	Missing		
	Total		163	100	100		Σfx $=495.5$

Valid Case = 159

Missing Cases = 4 = 2.45 %

Mean score = $\Sigma fx / \Sigma f = 495.5 / 159 = 3.12$

Statement 12: "Computerization has influenced the management."

This statement seeks to test the perception of the respondents about the impact of Computerization or IT use in S&T libraries on style of functioning of the library managers. Out of the 163 respondents, only 1 (0.61 %) not responded (Missing) the statement. Cumulatively about 40% of our sample agreed to this statement including about 8 % who strongly agreed to it. Significantly less than 30% of our sample indicated their disagreement and 31.09 about same number of sample were neither agree nor disagree to it. The mean score of perception for this statement is 2.60 which lies on scale near "neither agree nor disagree."

Table. ST12

Label	Class Interval	Mid Value (x)	Frequency (f)	Percent	Valid percent	Cumulative Percent	f.x
Strongly disagree	0-1	0.5	12	7.36	7.40	7.40	6
Disagree	1-2	1.5	36	22.09	22.22	29.62	54
Neither agree nor disagree	2-3	2.5	51	31.29	31.48	61.1	127.5
Agree	3-4	3.5	50	30.67	30.85	91.5	175
Strongly agree	4-5	4.5	13	7.98	8.05	100	58.5
No response			1	0.61	Missing		
	Total		163	100	100		$\Sigma fx = 421$

Valid Case = 162

Missing Cases = 1 = 0.61 %

Mean score = $\Sigma fx / \Sigma f = 421 / 162 = 2.60$

Statement 13: "IT will improve the speed of decision making."

This statement seeks to test the perception of the respondents about the effectiveness of IT for library managers. Out of the 163 respondents, 1 (0.61 %) not responded (Missing) the statement. Cumulatively a majority (41.36%) of our sample were in favor of this statement, including more than 15% who strongly agree to this. Significantly 31.48% of our this sample indicated their disagreement to it, while more than a quarter (27.16%) indicated ambivalence. The mean score of perception for this statement is 2.61 which lies on the scale "neither agree nor disagree."

Table. ST. 13

Label	Class Interval	Mid Value (x)	Frequency (f)	Percent	Valid percent	Cumulative Percent	f.x
Strongly disagree	0-1	0.5	18	11.05	11.11	11.11	9
Disagree	1-2	1.5	33	20.25	20.37	31.48	49.5
Neither agree nor disagree	2-3	2.5	44	26.99	27.16	58.64	110.
Agree	3-4	3.5	46	28.22	28.40	87.04	161
Strongly agree	4-5	4.5	21	12.88	12.96	100	94.5
No response			1	0.61	Missing		
	Total		163	100	100		$\Sigma fx = 424$

Valid Case = 162

Missing Cases = 1 = 0.61 %

Mean score = $\Sigma fx / \Sigma f = 424 / 162 = 2.61$

Statement 14: "S& T libraries are connected with Internet."

Networking is the major constituent of the Computer-based system. The statement : "S& T libraries are connected with Internet ." seeks to test the perception of the respondents about the use of this constituent of IT in S&T libraries. Out of the 163 respondants, 4 (2.45 %) not responded (Missing) the statement. Cumulatively slightly above 38% of our sample were in favor of this statement. Significantly about 30 % of our this sample indicated their disagreement to it, while more than 30% neither agree nor disagree to it. The mean score of perception for this statement is 2.46 which lies on scale near "dis-agree".

Table. ST. 14

Label	Class Interval	Mid Value (x)	Frequency (f)	Percent	Valid percent	Cumulative Percent	f.x
Strongly disagree	0-1	0.5	25	15.34	15.72	15.72	12.5
Disagree	1-2	1.5	24	14.73	15.09	30.81	36
Neither agree nor disagree	2-3	2.5	49	30.06	30.82	61.63	122.5
Agree	3-4	3.5	54	33.13	33.96	95.59	189
Strongly agree	4-5	4.5	7	4.29	4.41	100	31.5
No response			4	2.45	Missing		
	Total		163	100	100		Σfx =391.5

Valid case = 159

Missing cases = 4 = 2.45 %

Mean score = $\Sigma fx / \Sigma f = 391.5 / 159 = 2.46$

Statement 15: S & T Libraries are having Integrated Library software.

The statement “S & T Libraries are having Integrated Library software” seeks to test the perceptions of the respondents about the Integrated Library software. Out of the 163 respondents, 3 (1.84 %) not responded (Missing) the statement. Cumulatively above 32% of the population favoured the integrated software. Significantly 36.25 of the population were not agree to this statement. While more than 31.25% of it indicated ambivalence. The mean score of perception for this statement is 2.38 which lies on scale “Disagree”.

Table. ST. 15.

Label	Class Interval	Mid Value (x)	Frequency (f)	Percent	Valid percent	Cumulative Percent	f.x
Strongly disagree	0-1	0.5	22	13.50	13.75	13.75	11
Disagree	1-2	1.5	36	22.09	22.50	36.25	54
Neither agree nor disagree	2-3	2.5	50	30.67	31.25	67.50	125
Agree	3-4	3.5	43	26.38	26.88	94.38	150.5
Strongly agree	4-5	4.5	9	5.52	5.62	100	40.5
No response			3	1.84	Missing		
	Total		163	100	100		Σfx =381

Valid Case = 160

Missing cases = 3 = 1.84 %

Mean score = $\Sigma fx / \Sigma f = 381 / 160 = 2.38$

Statement 16: "New information policies of Government are pulling the libraries towards computerization."

The statement "New information policies of Government are pulling the libraries towards computerization." seeks to test the perception of the respondents about the impact of the Government policies regarding IT applications in S&T libraries. All the 163 respondents, responded the statement. Cumulatively about 14.72% of our sample were not aware about the impact of these policies and they were neither agreed nor disagreed to this statement. Majority of the respondents i.e. 77.92 % Agreed to the statement, while about 7.36 % disagreed to this. The mean score of perception for this statement is 3.29 % which lies on the scale as "Agree."

Table. ST. 16

Label	Class Interval	Mid Value (x)	Frequency (f)	Percent	Valid percent	Cumulative Percent	f.x
Strongly disagree	0-1	0.5	2	1.23	1.23	1.23	1
Disagree	1-2	1.5	10	6.13	6.13	7.36	15
Neither agree nor disagree	2-3	2.5	24	14.72	14.72	22.08	60
Agree	3-4	3.5	111	68.10	68.10	90.18	388.5
Strongly agree	4-5	4.5	16	9.82	9.82	100	72
No response			Nil	Nil	Nil		
	Total		163	100	100		$\Sigma fx = 536.5$

Valid Case = 163

Missing Cases = Nil

Mean score = $\Sigma fx / \Sigma f = 536.5 / 163 = 3.29$

Statement 17: " More stress is being given on the cost effectiveness and performance of the library operations, services, and resources."

The statement " More stress is being given on the cost effectiveness and performance of the library operations, services, and resources." seeks to test the perception of the respondent about the importance of IT application in S&T libraries. All the 163 respondents, responded the statement. Cumulatively 68.10 % of the population of the sample were agreed to this statement, including 11.66% strongly agree to it. Significantly 14.10% of our sample indicated their disagreement to this statement, while 31.90 % indicated ambivalence. The mean score of perception for this statement is 3.11 which lies on scale "Agree".

Table. ST. 17.

Label	Class Interval	Mid Value (x)	Frequency (f)	Percent	Valid percent	Cumulative Percent	f.x
Strongly disagree	0-1	0.5	8	4.90	4.90	4.90	4
Disagree	1-2	1.5	15	9.20	9.20	14.10	22.5
Neither agree nor disagree	2-3	2.5	29	17.80	17.80	31.90	72.5
Agree	3-4	3.5	92	56.44	56.44	88.34	322
Strongly agree	4-5	4.5	19	11.66	11.66	100	85.5
No response			NIL	NIL	NIL		
	Total		163	100	100		Σfx 506.5

Valid case = 163

Missing cases = 0

Mean score = $\Sigma fx / \Sigma f = 506.5/163 = 3.11$

Statement 18: " Now library schools are producing library professionals with specialization in computer & computer based management Techniques."

This statement seeks to test the perception of the respondents about the availability of trained manpower related to the IT application in S&T libraries. Out of the 163 respondents, 1(0.61 %) not responded (Missing) the statement. Cumulatively 35.80% of our sample were not in favor of this statement. Significantly less than 29.01% of our this sample indicated their agreement to the above this statement, while more than 35.19% indicated ambivalence. The mean score of perception for this statement is 2.33 which lies on scale nearer to "dis-agree."

Table. ST. 18.

Label	Class Interval	Mid Value (x)	Frequency (f)	Percent	Valid percent	Cumulative Percent	$f.x$
Strongly disagree	0-1	0.5	22	13.50	13.58	13.58	11
Disagree	1-2	1.5	36	22.08	22.2	35.80	54
Neither agree nor disagree	2-3	2.5	57	34.97	35.19	70.99	142.5
Agree	3-4	3.5	42	25.77	25.93	96.92	147
Strongly agree	4-5	4.5	5	3.07	3.08	100	22.5
No response			1	0.61	Missing		
	Total		163	100	100		Σfx =377

Valid case = 162

Missing case = 1 = 0.61 %

Mean score = $\Sigma fx / \Sigma f = 377 / 162 = 2.33$

Statement 19: " The library governance is stressing on more justification of resources and on projected future information."

This statement seeks to test the perception of the respondents about the attitude of library governance about the use of Computer-based system in S&T libraries. All the 163 respondents, responded the statement. Cumulatively 71.78 % of the population of our sample were in favor of this statement out of this 21.47% strongly agreed to the statement. Significantly more than 11.04 % of our this sample indicated their disagreement to the above statement, while 28.22 % respondents indicated ambivalence. The mean score of perception for this statement is 3.31 which lies on the scale as " Agree"

Table. ST. 19.

Label	Class Interval	Mid Value (x)	Frequency (f)	Percent	Valid percent	Cumulative Percent	f.x
Strongly disagree	0-1	0.5	2	1.22	1.22	1.22	1
Disagree	1-2	1.5	16	9.82	9.82	1.04	24
Neither agree nor disagree	2-3	2.5	28	17.18	17.18	28.22	70
Agree	3-4	3.5	82	50.31	50.31	78.53	287
Strongly agree	4-5	4.5	35	21.47	21.47	100	157.5
No response			Nil	Nil	Nil		
	Total		163	100	100		$\Sigma fx = 539.5$

Valid case = 163

Missing cases = Nil

Mean score = $\Sigma fx / \Sigma f = 539.5 / 163 = 3.31$

Statement 20: "Information revolution demands the computerization of S&T libraries as early as possible."

This statement seeks to test the perception of the respondents the need of the Computer-based system in S&T libraries. All the 163 respondents, responded the statement. Cumulatively 72.90 % of the respondents of our sample supported this statement out of which about 18% strongly supported to it. Significantly only 9.20% indicated their disagreement to the above statement, while nearly 27% indicated ambivalence. The mean score of perception for this statement is 3.30 which lies on the scale "Agree".

Table: ST. 20.

Label	Class Interval	Mid Value (x)	Frequency (f)	Percent	Valid percent	Cumulative Percent	f.x
Strongly disagree	0-1	0.5	3	1.84	1.84	1.84	1.5
Disagree	1-2	1.5	12	7.36	7.36	9.20	18
Neither agree nor disagree	2-3	2.5	29	17.80	17.80	27.00	72.5
Agree	3-4	3.5	90	55.21	55.21	82.21	315
Strongly agree	4-5	4.5	29	17.79	17.79	100	130.5
No response			Nil	Nil	Nil		
	Total		163	100	100		Σfx = 537.5

Valid case = 163

Missing cases = Nil

Mean score = $\Sigma fx / \Sigma f = 537.5 / 163 = 3.30$

Statement 21: "The IT based library will make librarian's work easier.

This statement seeks to test the perception of the respondents about the benefit of the Computer-based system in S&T libraries. All the 163 respondents, responded the statement. Cumulatively large majority (71.17 %) of our sample supported this statement Out of which more than 12% strongly supported to it. Significantly about 13% of our this sample indicated their disagreement to the above statement, while nearly 29 % indicated ambivalence. The mean score of perception for this statement is 3.19 which lies on the scale as "Agree".

Table . ST 21

Label	Class Interval	Mid Value (x)	Frequency (f)	Percent	Valid percent	Cumulative Percent	$f.x$
Strongly disagree	0-1	0.5	3	1.84	1.84	1.84	1.5
Disagree	1-2	1.5	18	11.04	11.04	12.88	27
Neither agree nor disagree	2-3	2.5	26	15.95	15.95	28.83	65
Agree	3-4	3.5	96	58.90	58.90	87.73	336
Strongly agree	4-5	4.5	20	12.27	12.27	100	90
No response				Nil	Nil		
	Total		163	100	100		Σfx = 519.5

Valid case = 163

Missing cases = Nil

Mean score = $\Sigma fx / \Sigma f = 519.5 / 163 = 3.19$

7.3: TESTING OF HYPOTHESIS : CHI-SQUARE SIGNIFICANCE

TESTING:

The hypothesis's were tested using Pearson's Chi- Square test for significance test. Significance level was set to 0.05 level. The degree of freedom was set according to suit the requirement as the Chi-Square table.

NULL HYPOTHESIS.1:

There is no significant difference between those who are involved in computerization and those who are not involved as regards their perception of IT in S&T Library as powerful technique to provide timely and relevant information.

As given in Table. RST2. The Statement "Use of IT in libraries provides timely and cost effective services to the Library Users." The statement seeks to test the perception of the respondents about the Usefulness of the IT - based systems in the given S&T libraries under study. Out of the 163 respondants, 6 (3.7 %) not responded (Missing). Cumulatively 73.25 % of our sample were of the opinion that use of IT in libraries provides timely and cost effective services to the Library users. This includes the 14.65 % respondents who strongly perceive so. Significantly less than 9% of this sample indicated disagreement to the above statement, while nearly 17.83% indicated ambivalence. The mean score of perception for this statement is 3.28 which lies on the scale Agree.

Table..

Label	Class Interval	Mid Value (x)	Frequency (f)	Percent	Valid percent	Cumulative Percent	f.x
Strongly disagree	0-1	0.5	0	0	0	0	0
Disagree	1-2	1.5	14	8.59	8.92	8.92	21
Neither agree nor disagree	2-3	2.5	28	17.18	17.83	26.75	70
Agree	3-4	3.5	92	56.44	58.60	85.35	322
Strongly agree	4-5	4.5	23	14.11	14.65	100	103.5
No response			6	3.68	Missing		
	Total		163	100	100		$\Sigma fx = 516.5$

Valid case = 157

Missing cases = 6, = 3.68 %

Mean score = $\Sigma fx / \Sigma f = 516.5 / 157 = 3.28$

The Chi-Square (Pearson) value of (6.41) is significant at the level of 5% (.0408).

Therefore, the null hypothesis is rejected, indicating that there is a difference in perception of the utility of IT based library systems among those who are involved with IT and those who are not as regards their perception of IT in S&T Library as powerful technique to provide timely and relevant information. This finding suggests that first hand exposure to IT can change the out look of library professionals towards the importance of IT application in libraries. Importance of this hypothesis : if first hand exposure can significantly alter the out look of library professionals then organizing intensive training program on the working of computers is likely to convince them of the benefits of computerization.

RST 2. Information Technology is powerful tool.. involvement whether INVOLVED in Library Computerization, IT application.

Table. INVOLVEMENT

Variable	Value	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	1	115	70.6	70.6	70.6
No.	2	98	29.4	29.4	100
	Total	163	100	100	

Valid cases 163 Missing cases 0

RST2	Count	Involved (Yes) (1.00)	Not Involved (2.00)	Row Total
Disagree	1	6	10	16 9.81%
Neither	2.	20	15	35 21.47%
Agree	3.	67	45	112 68.72%
	Column	93	70	163
	Total	57.05%	42.95%	100%
Chi-Square	Value	DF	Significance	
Pearson	6.41	2	0.04	

NULL HYPOTHESIS.2 :

There is no significant difference between professionals of different S&T libraries as regards their perception of the encouragement given by various professional bodies. The Chi-squae (Person) value of (19.62) is significant at the level of 1% .00059). Therefore, the null hypothesis is rejected, indicating that there is a difference in their perception of the encouragement given by various professionals of different libraries.

Table: Respondent Profile (Library managers).

Name of Organization	Count	Disagree	Neither	Agree	Row	%	Cumulative Percent
WHO	1	1	1	1	3	1.84	0.84
UNESCO	2	0	1	1	2	1.23	3.07
INSDOC	3	5	8	10	23	14.11	17.18
DESIDOC	4	2	5	10	17	10.43	27.61
0AIIMS	5	0	1	1	2	1.23	28.84
IIT wD	6	1	1	3	5	3.07	31.91
TERI	7	0	1	1	2	1.23	33.14
SPA	8	0	1	1	2	1.23	34.37
DU	9	2	3	9	14	8.59	42.96
JNU	10	2	1	4	7	4.29	47.25
HAMDARD	11	1	1	2	4	2.45	49.7
IARI	12	1	2	2	5	3.07	52.77
GGS & IP	13	1	0	2	3	1.84	54.61
27 GGS&IP affiliated Institutions	14	2	13	12	27	16.56	71.17
IGNOU	15	0	2	1	3	1.84	73.01
JAMIAM	16	1	1	1	3	1.84	74.85
UGC	17	1	1	0	2	1.23	76.08
AICTE	18	0	0	1	1	0.61	76.69
DRDO& Labs	19	2	3	4	9	5.52	82.21
CSIR & Labs	20	1	4	2	7	4.29	86.5
ICAR& Labs	21	2	2	1	5	3.07	89.57
ICMR& Labs	22	1	1	2	4	2.45	92.02
NML	23	2	1	5	8	4.91	96.93
NIHFW	24	0	1	1	2	1.23	98.16
AIU	25	0	1	0	1	0.61	98.77
INSA	26	0	1	1	2	1.23	100
Total	26	28	57	78	163	100	

Chi-Square	Value	DF	Significance
Pearson	19.02	4	0

Number of Missing observations: 0

NULL HYPOTHESIS.3: “ There is no significant difference between male and female professionals in libraries as regards their perception of the encouragement given by various professional bodies.”

The Chi-square (Pearson) value of (1.74) is not significant at the level of 5% (.42). Therefore, the null hypothesis is accepted indicating that there is no difference among men and women professionals in their perception of the encouragement given by various professional bodies of different libraries.

Table. MALE / FEMALE

Variable	Value	Frequency	Percent	Valid percent	Cumulative Percent
Male	1	108	66.26	66.26	66.26
Female	2	55	33.74	33.74	100
Total		163	100	100	100

Valid Cases 163 Missing cases 0

RST3 Various bodies encouraging use of Comp. M. By SEX

RST2	Count	Male (1.00)	Female (2.00)	Row Total
Disagree	1	20	6	26 16.56%
Neither	2.00	33	23	56 34.35%
Agree	3.00	53	28	81 49.69%
	Column	106	57	137
	Total	65.03	34.97	100
Chi-Square	Value	DF	Significance	
Pearson	1.44	2	0.42	

Number of missing observation = 0

NULL HYPOTHESIS. 4:

There is no significant difference between those who have knowledge of computers (IT) and those who have no knowledge of computers (IT) as regards their perception of the encouragement given by various professional bodies."

Table. KNOWLEDGE OF COMPUTERS

Variable	Value	Frequency	Percent	Valid percent	Cumulative
Yes	1	121	74.23	74.23	74.23
No	2	42	25.77	25.77	100

Valid cases 163 Missing cases = 0 = 0%

RST3. Various bodies encouraging use of Computer-based MIS.

By Knowledge of Computers

RST2	Count	Involved (Yes) 1.00	(No) 2.00	Row Total
Disagree	1	15	12	27 16.66%
Neither	2.00	34	22	56 34.6%
Agree	3.00	64	15	79 48.76%
	Column	113	49	162
	Total	69.75	30.25	100

Number of Missing Observation: 1

Chi - Square value of Significance.

Chi-Square	Value	DF	Significance
Pearson	5.72	2	0.06
Likelihood	5.75	2	0.06
Mantel-Haenszel Test for Linear Association	5.7	1	0.02

Minimum Expected Frequency - 10.765

Importance of this hypothesis : This hypothesis shows that the first hand exposure of Computer & IT can significantly alter the out look of library professionals. This advocate that at the recruitment policy of the organization should be that to appoint the persons having specialized courses in computer application alongwith Professional training in Library and

Information Science. In addition to this for in service Library managers on hand training programmes should organized. This may be refresher courses type of courses having more inclination towards IT & Computer application in Libraries. Such type of short term course give them exposure as well as convince them benifits of computers. The study shows that organizing intensive training programs for the in-service Library managers will not be more beneficial in comparison to short term programs. Such short term programmes may be sufficient to convince the in-service Library Managers about the benefits of computerization.

CHAPTER 8

CONCLUSIONS AND RECOMMENDATIONS:

On the basis of the result of the Literature Survey & Field survey, the study concludes that there are unlimited opportunities and benefits provided by the Information Technologies (IT) for S&T Libraries, but these technologies are not being used uniformly by them and there is a gap in the extent of their use. It also explores the factors responsible for this Gap & suggests a Model Criteria for adoption and use of IT by these libraries. In the end of the Chapter it also gives its recommendations.

CONCLUSIONS AND RECOMMENDATIONS

7.1. OVERVIEW:

The literature survey presented a literature review. It explored the :

- Opportunities and threat of information technology of Information technologies.
- Background literature for Nolan's 6 Stage Growth Model & SWOT analysis.
- A frame work for Criteria of evaluation of IT use in S&T Libraries.
- The use of IT in the given 75 S&T Libraries, a research design was developed.

On the basis of Organizational questionnaires and Organizational Data Sheet the study tried to investigate:

- The Phase of development of IT use in S&T libraries.
- The factors associated with the gap in the use of IT in S&T libraries.
- Model Criteria for IT use in S&T libraries.

8.2 CONCLUSIONS:

The Review of the literature shows that lot of literature related to the IT use in S&T libraries is being published by the librarians and other specialist in the related field. Such literature is being published by in several international & National journals both related to Library Science as well as in related fields. The status of Computer-based literature as shown in the literature survey as well as given in the CD-ROM search of LISA Jan.'89 to December 2000 and the Compendex Plus Jan'89 to Jan 2001 shows that on different topics of IT use there were lot of information . For example on " Management" there were 31997 articles and books , on " Information" there were more than 1,13,870, and on "systems" there were more than 32,229 articles and books. The study also explored that there are unlimited opportunities and benefits of IT use in S&T Libraries and suggested a strategy for successful implementation of IT in these libraries.

Findings of the **Organizational study & SWOT analysis** show that all the given library systems are making the use of computer for the purpose of library management. However, the degree of and number of information area systems which were computerized varies.

- Out of the 75 libraries under study, only 25 are connected with the campus network and DELNET.
- At Nolan's 6 Stage Growth Model Scale, out of the 75 libraries under study, there is no library or Documentation Center available in Phase VI. There are only two libraries which are in Phase V of development. One of them is a Documentation Center and another one is a Library of Institutions of National Importance. The main factors of availability of this phase in these libraries are qualified staff, Availability of fund, Encouragement by the organization, awareness of benefits of IT, Status of Librarian etc.

Same number of organizations were found in Phase IV. All the factors of growth &

development as applicable for Phase V, also applicable to the libraries available in Phase

IV. In Phase III of development , there were only 4 libraries.

- There were maximum libraries were available in Phase I & Phase II. About 50 Libraries were available in Phase I and 17 libraries in Phase II. This shows that there is lack of availability of sufficient fund for IT acquisition and implementation, lack of qualified personals, lack of encouragement by the organization, lack awareness of benefits of IT, lack of proper status of Librarian etc.
- The study indicates that all the libraries in stage III to V were having their own in-house data base of more than 1 lakh records of books. It also indicates that no one of them is having all their bibliographic data conversed in to computerized one. All of them were also having their OPAC.
- Out of the 75 libraries under study it was, observed that all the libraries in Nolan's phases of development between III to V were having the central efforts for IT application. These S&T libraries are having their separate computer Application Division in their Library.
- It was also observed that all the libraries between phase III to V were having their integrated Modular Library Software in multi-user environment.
- In terms of the use of Communication Format and Data Dictionaries, there was no indication of a common data elements dictionary. Though all of them followed all the mandatory data element of UNESCO Common Communication format.
- In terms of computer resources used to support management function of the given libraries, the study indicated that some libraries are using only Pentium PCs, some of them are using server, and non of them is using Main Frame systems.

The findings of the **Perceptual Study** shows that :

The use of IT in S&T Libraries is influenced by the different perceptual, cultural , and attitudinal variables. The conclusion of the Perceptual Study is drawn on the basis of:

1. Analysis of the Respondents Profile,
2. Analysis of Statements,
3. Testing of hypothesis,
4. SWOT Analysis.
5. Auditing of all the factors of SWOT analysis.

The Respondent Profile shows that:

- Involvement in the Library automation also had a positive effect on the perception of library managers towards IT use in S&T libraries.
- Gender of the library professionals played no role in their perception towards IT use in S&T libraries.
- Knowledge of Computer had positive effect on the perception, attitudes, and value towards IT use in S&T libraries.
- Computer Qualifications also had positive relationship with the perceptions towards IT use in S&T libraries.
- Library managers in the various age group had no difference in their perception towards IT use in S&T libraries.
- Library managers in various group of salary Pay scale had no difference in their perception towards IT use in S&T libraries.

The Analysis of statement shows that:

- The average mean score of all the 21 statements is 3.15 which mean that the perception of Library Managers about the use of Computer based MIS lies some where between agree and undecided positions at the Likert scale. This shows that the Library Managers understand the capabilities of the IT use in S&T libraries.

- The trend of the responses that those who are involved in computerization they are more aware about inherent capabilities of IT use - the respondents feel that IT use can help them to provide better service for providing quality management information.
- Over and above the, the perception of the managers of those library who are having computerization was quite positive.
- There were very few library managers whose library is in very initial stage of computerization or there is no computerization, perceived IT use as a burden. This is perhaps due to the fact that due to ill planning and implementation they faced lot of problems and they are having negative perception about its usage.
- Statement 4 and 5 load highly on the factor "Future Outlook". This indicate that the new information has reached at the door steps of library which has created a high pressure of change. The conclusion drawn from this factor is that the library managers should be prepared to accept the challenges of change. This also suggest that there is a need to prepare all the inputs man, material, management machines to face the future challenges.
- The second Factor "Support & Direction" Comprises top management support (St.9); Financial Support (St. 10); Impact on management style (St. 11; St.2 ; St.1; and St.14. Except St. 11 all are related to the development in external environment of which our respondent show strong agreement. This indicates that they are highly aware of the changes and new development.
- The St.11 "library managers are afraid o computerization" also loads or correlated highly with this factor. This indicates that there is a lack of practical knowledge and skill to understand and derive benefits from these latest changes in information technology related to the libraries.

The Auditing of the results of the Respondent profiles, Organizational managerial perceptual study and the SWOT Analysis study taken together, clearly demonstrated that:

- The mean score of the growth of development of Information Technology in totality in all the 75 S&T libraries of Delhi region is 0.363, which shows that the libraries at Nolan's 6 stage Growth Model are in phase II.
- While the perception of the respondents is characteristic of Phase V, the existing infrastructure and resources for computer based MIS in academic libraries is characteristic of Phase II.
- This represents a serious gap in the future expectations of respondents and the support provide to them.

Some of the factors of slow growth in the development of I T application in the libraries investigated in the study are :

Managerial Factors - Human tecno-fobia have been found one of the reasons for the slow growth in the development of IT in S&T libraries.

- It is found that it is a technical responsibility with little participation of library mangers, as a result many of the systems proved to be unsuccessful to meet management requirements.
- Hiring and maintaining qualified personnel to support the development is also a problem.
- Lack of familiarity with the advanced and use of new information technology by the library managers is also a great problem.

Information Factors - Most of the computer applications were designed around prevalent operational need with little attention information requirement of the library decision maker.

Systems Factors - Where on hand the availability of computer Hardware and Software resources forced the development of computer-based MIS as a need to make their better use,

on the other hand their maintenance and use was found a problem. The planning of Computerization project is also lacking the well structured technique.

Technological Factor: Technological conversion of Information Technology - telecommunication, data communications, Internet, Satellite and terrestrial broadcasting, software and content creations etc. are the Constant & external factors.

8.3 Recommendations

It is recommended that:

- A Computer Monitoring Committee should be establish by all the S&T library with the objective for the planning and policy making for IT application & sharing of Digital resources. This should be high power committee may be headed by the Chief executive of the Institution with the representation of Librarian' Head, Computing facilities in the institute' and two Computer specialists nominated by the executive Council of the Institute.
- The procedure for the proper coordination among the S&T libraries should be evolved for the effective implementation of IT application & Digital resource sharing in S&T libraries..
- S&T libraries should cooperate in developing a common data element dictionary that can be used within each institution and among the institutions. The availability of a common data dictionary for these libraries will improve the possibilities of data exchange within the institution and among the academic libraries of other institutions.
- The institutions of the concerned S&T libraries should motivate the staff involved in IT application and development.

- The training needs should be assessed based on the level of user awareness. Training to personnel should also match the requirements of users and the existing resources.
- There is a need to chalk out the plan for acquisition and implementation of IT resources and also to decide the criteria of specification for acquisition of resources.
- There is a need to implement the plan in phased manner.

8.4. Areas of further research

In the study important aspects could not be covered due to the limitation of the study. There is a need to study in depth all the important aspects related to:

- The issues related to the IT application in S&T libraries in association with the various Social, Technological and behavioral issues such as: a). Motivational; b) Personality; Attitude; Job satisfaction; c) Career advancement; d) Organizational Climate; e) Areas of conflicts ; f) Planning and Management of Computing Resources, Social issue etc.
- The present study is limited to the broad aspects of Organizational and Perceptual aspects of the development and growth in the given S&T libraries all available in Delhi, there is a need to conduct such study in depth taking one or two aspect on all India basis.
- It is also suggested that similar kinds of studies can be undertaken in different type of libraries available in different metropolitan cities.
- There is also a need to undertake study related to the all aspects of resource sharing specially the digital material in S&T libraries.

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&
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Date: 19. 02. 2000

Dear Sir, Madam,

I am a Ph. D research scholar (Supervisor : Dr. M.T.M. Khan, Prof. & Head, Department of Library and Information Science), of the Bundelkhand University, Jhansi. The topic of my Ph.D is "Information Technology (IT) in libraries of Science and Technology (S&T) organizations. A comparative study of selected libraries of Delhi". The aim of the study is:

- To review the related literature.
- To study the Growth and Development of Information Technology (IT) in the Academic as well as Research libraries in the field of science and Technology (S&T) of Delhi region.
- To study the factors associated with the use of IT in the libraries.
- To design a system methodology for growth and development of IT in S&T libraries.

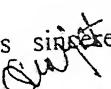
For this study a survey of the S&T Libraries of Delhi region is being conducted by me. One questionnaire and one data sheet is designed for this purpose.

I shall be highly obliged if you kindly extend your help in completion of the Questionnaire & Data sheet both. The questionnaire may please be filled by yourself. The necessary data related to organizational datasheet will be collected by me personally. Your help in collection of data through data sheet is also solicited.

The responses will be kept completely confidential. The data will be used solely for academic purpose. It will not affect in any way the name of the organization or individual.

Thanking you,

Yours sincerely,


(SHUJAT HUSSAIN)

D-2 / A.4, I. I. T. New Delhi -16

ORGANIZATIONAL STUDY

Library Resources Data Sheet

NAME & ADDRESS OF LIBRARY

General information:

Please provide following data related to your library:

Library OPAC Address

Library Internet connectivity

Library Software

Library Server

Library Networking

Budget

Collection

Library Building

Professional Staff

Semi professional staff

Computer /IT Staff

Administrative staff

Services

Users

Timing

Resources Sharing arrangement

Library Committee

SWOT ANALYSIS DATA

In which of the following areas do you think your library and information centre is strong ?

1. STRENGTHS (S)

I. Specialized Collection

S.No.	Data
a)	Name the Specialized area of collection of your library.
b)	No. of Electronic journals on subscription.
c)	Name MOU / License for access to more WEB SITES of electronic journals

III. CD-ROM DATABASES

S.No.	Please write tick
a)	Name of ERL based CD-ROM
b)	Name of Indian CD-ROM databases.
c)	Budget allocation for CD-ROM Year 2000 Year 2001
d)	Name of CD-Net Systems
e)	CD-ROM services
f)	CD-WRITER
g)	CD-ROM Promotional activities
h)	Any other services (please specify)

IV STAFF

S.No.	Please write tick
a)	Do you have Programmer or System staff in your Library
b)	Programmer
c)	Staff with knowledge of computer

V) INFRASTRUCTURE

S.No.	Please write tick
a)	Separate space in library for access to E-journals
f)	Internet connections
g)	CD_NET / Networking

VI) FINANCE

S.No.		Please write tick
a)	Adequate budget	
b)	Computer Projects	
c)	Govt. / UGC aids	

2. WEAKNESSES (W)

In which of the following areas do you think it is weak

I. COLLECTION

S.No.		Please write tick
a)	imbalance/inadequate collection	
b)	inability to acquire current/last est documents	
c)	lack of access to national and international databases	
d)	any other (please specify)	

II. SERVICES

S.No.		Please write tick
a)	irregularity	
b)	price	
c)	physical format	
d)	currency	
e)	lack of proper access/mode of delivery	
f)	lack of proper promotional activities	
g)	any other (Please specify)	

III. STAFF

a)	lack of skills	
b)	less in number	
c)	attitudes	
d)	any other (Please specify)	

IV. INFRASTRUCTURE

S.No		Please write tick
a)	unsuitable furniture	
b)	storage problem	
c)	lack of proper equipment	
d)	problem with manual methods	
e)	inability to adopt modern technology	
f)	any other (please specify)	

V. FINANCE

S.No		Please write tick
a)	adequate budget	
b)	lack of financial policy	
c)	any other (please specify)	

3. OPPORTUNITIES (O)

Please mention the opportunities available to market your services effectively.

S.No.	Please write tick
Funds to acquire new Technology	
Adaptability of new advanced technology	
Govt support of new patrons	
Government policies/procedure	
new premises/accommodations/branches	
any other (please specify)	

4. THREATS (T)

Do you foresee any of the following factors that would affect your capability to function effectively.

S.No	Collection	Please write tick
a)	Database vendors	
b)	hardware/software vendors	
c)	influence of conventional procedures on decision making	
d)	staff training	
e)	reduced funding	
f)	INTERNET	
g)	lack of adequate manpower	
h)	lack of sufficient date to take decisions	
i)	attitudes and values of management	
j)	attitudes and values of users	
k)	attitudes and values of users	
n)	alienation of users	
o)	any other (please specify)	

I. INFRASTRUCTURE

S.No	Please write tick
a)	lack of spacious accommodation
b)	problem with manual methods
c)	lack of proper physical facilities
d)	lack of proper physical facilities
e)	lack of modern technology
f)	any other (please specify)

II. COLLECTION

S.No	Please write tick
a)	inadequate collection in terms of coverage/scope
b)	currency of collection
c)	problem of acquiring foreign periodicals/books
d)	acquisition of documents in electronic media
e)	any other (please specify)

III. PRODUCTS / SERVICES

S.No		Please write tick
a)	fixing the price of information services and products	
b)	low demand for services/products	
c)	pricing of services led to low demand	
d)	problems with conventional channels of distribution	
e)	any other (please specify)	

IV FINANCE

S.No		Please write tick
a)	lack of adequate funds	
b)	rising costs	
c)	lack of proper financial policy for marketing	
d)	lack of timely grants/funds	
e)	any other (please specify)	

V. STAFF

S.No		Please write tick
a)	lack of trained staff	
b)	Rising costs	
c)	lack of proper financial policy for marketing	
d)	lack of timely grants/funds	
e)	any other (please specify)	

VI. OTHERS

S.No		Please write tick
a)	lack of management support	
b)	attitudes of users	
c)	lack of proper awareness on marketing information products	
d)	any other (please specify)	

STUDY OF ORGANIZATIONAL CULTURE

(Managerial attitudes, perceptions, values etc.)

QUESTIONNAIRE - A

The purpose of questionnaire is to gather data on the perception of the library managers about the use of Information Technology, its practices, procedures and policies in your library. Please indicate the extent to which you agree or disagree with each of the following statements:

(SA) = Strongly Agree
(A) = Agree
(U) = Undecided

(D) = Disagree
(SD) = Strongly Disagree

SA A U D SD

(1) There is an emerging trend of literature related to the Information Technology (IT) in S&T libraries.	.....	....	....	....	....
(2) Use of IT in libraries provides timely and cost effective services its users.	.....	....	....	....	....
(3) Various professional bodies, Universities, Research institutions, Government etc. are helping in the use of IT in libraries.	.....	....	....	....	....
(4) In the near future the S&T libraries will be converted to the digital libraries.	.....	....	....	....	....
(5) The use of IT will essentially be needed by the S&T libraries in the near future.	.....	....	....	....	....
(6) Librarians are well versed with the use of IT based management techniques.	.....	....	....	....	....
(7) Most of the library managers are having working knowledge of IT and Internet.	.....	....	....	....	....
(8) S&T librarians need not require any rigorous training in computerization.	.....	....	....	....	....
(9) Top management are keen in computerization	.....	....	....	....	....
(10) Funds for computerization are no limitation.	.....	....	....	....	....
(11) Librarians are afraid of computerization	.....	....	....	....	....
(12) Computerization has influenced the management	.....	....	....	....	....
(13) IT will improved the speed of decision making	.....	....	....	....	....

(14) S&T libraries are connected with Internet.

(15) S&T libraries are having Integrated Library software.

(16) New information policies of Government are pulling the libraries towards computerization.

(17) More stress is being given on the cost effectiveness and performance of the library operations, services, and resources.

(18) Now library schools are producing library professional with specialization in computer & computer based management techniques.

(19) The library governance is stressing on more justification of resources and on projected future information.

(20) Information revolution demands the computerization of S&T library as early as possible.

(21) The IT based library will make librarians work easier

Demographic Details:

1. Name of the respondent:
2. Name of the organization:
3. Designation of respondents:
4. Pay Scale
5. Age... years
6. Male / female
7. Level of professional qualification :M.Lib/ M.Phil/Ph.D.
8. Experience in Computer/information technology work .

Comments if any :

QUESTIONNAIRE - B

STUDY OF USE OF INTERNET BY THE LIBRARIANS :

1. Are you aware of computer Internet services from:

Not aware
Six months
1 Year
More than Year

2. Have you operated computer independently

Yes
No

3. When you used computer first time

One Year
Two year
More than two year

4. Do You have personal computer in your office.

Yes
No

5. Does your personal computer is with Internet facility.

Yes
No

6. Have you ever used Internet facility

Always
Rarely
Never

8. Does your Institute has Internet facility for staff.

Yes
No

9. Please mention, If the Internet facility is restricted to :

Limited access
Unlimited access

10. Do you have Cyber cafe in your Institute

Yes
No

11. Who introduce you to Internet use

Specialized training
Others

12. What is your main purpose for using Internet:

E-mail
Chat
Online search

13. Do you use e-mail for:

Just for near and dear
For Answer & question
Academic purpose

16. Do you use online search for:

Jobs
Conferences
Teaching & Research
Any other

17. Do you think Internet facility should be:

For all
For few
Very restricted

18. Do you think, Internet facility is useful:

Very useful
not much
not at all

20. Are you of the opinion that without the use of Internet persuasion of academic excellence is not possible.

Yes
No

21. Name the Web sites you generally use.

1....., 2....., 3.....

Name of the respondent & office Address

Appendix. II

CURRICULUM VITAE

Name : Shujat Husain
Father's Name : Late Sh. Sharafat Husain
Present Address : D-2/ A-4 Old Campus, I.I.T. Delhi, India.
(e-mail Address: shujat-husain@library.iitd.ernet.in)
Qualification: : B.Sc. M.A. M.Lib. Sc. Certificate in Computer Application.

Professional Experience:

More than 22 years working professional Experience. Presently Sr. Technical Assistant, Library (SG & SS) Substantially contributed in Library Computerization of IITD. Also worked in INSDOC, New Delhi from 1975 to 1979. Joined Central Library IIT, Delhi in May, 1980.

Participated in various Technical Courses/ Workshop related to computer application. Presented papers in various National journals and Seminars. Created Bibliographic Databases in IIT Delhi using CDS-ISIS.

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